THE

# JOURNAL OF GAS LIGHTING.

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## TO CORRESPONDENTS.

W. L., Southport.—*A 6 in. main 450 yards long, laid level, ought to deliver the undermentioned quantities per hour of Wigan cannel gas; specific gravity* ·500, *with the following losses upon the initial pressure:*—

| | | | | |
|---|---|---|---|---|
| 12.830 | *cubic feet, with the loss of* | . . | 1 | *in: pressure.* |
| 10.724 | *ditto* | *ditto* | . . 7-10*ths* | ,, |
| 9,072 | *ditto* | *ditto* | . . 5-10*ths* | ,, |
| 8,114 | *ditto* | *ditto* | . . 4-10*ths* | ,, |
| 7,027 | *ditto* | *ditto* | . . 3-10*ths* | ,, |
| 5,737 | *ditto* | *ditto* | . . 2-10*ths* | ,, |
| 4,057 | *ditto* | *ditto* | . . 1-10*th* | ,, |

A Subscriber.—*Multiply the number of candles by their consumpt. in grains of sperm per hour, and divide by* 120. *The quotient gives the number of* 120-*grain candles to which the light is equal. Thus: suppose the candle used consumes* 145 *grains per hour, and the gas-light is equal to* 10 *such candles, then*

$$10 \times 145 \div 120 = 12{\cdot}08 \text{ standard candles.}$$

J. C. Jones, Monkwell-street, *is in error if he supposes we intended, by our remarks upon his letter, to deny that other gas companies had followed the example set them by the Great Central Company, and had not taken the same means "to increase the quantity of gas registered, where there has been no alteration in the number of lights, or in the hours of burning." Let him ask Mr. Tallis, the printer, of St. John's-street; Mr. Bennetfink, the ironmonger, of Cheapside; Mr. Pringle, the tea dealer, of Bishopsgate-street; or Mr. Brandt, the tobacconist, of Fleet street, what economy they found in 4s. gas, and he will get some valuable information on the subject.*

## NOTICES.

Subscribers, who have not remitted their Subscriptions for the past year, are requested to do so without delay, so as to avoid any interruption in their receipt of the Journal.

The subscription is 10s. per annum if paid in advance, or 12s. on credit, payable in two sums of 6s. each, due in June and December of each year. All subscriptions commence from the 10th of January.

All communications and orders for Advertisements to be addressed to the Editor, 32, Bucklersbury, London.

Back numbers exceeding three months' date will in future be charged double price, unless six or more consecutive numbers are taken at the same time. Nos. 6, 15, 18, and 23 are out of print.

The Editor will be particularly obliged by his friends forwarding to him Notices of all Meetings, Trials, or Appeals which it may be interesting to the Gas World to have reported.

## Circular to Gas Companies.

*The Editor may be consulted on all subjects connected with the supply and manufacture of gas, or the alteration and improvement of gas apparatus, and the construction of new works.*

We had the pleasure of directing the attention of our readers, in July last, to a report by Dr. Frankland, the Professor of Chemistry in Owen's College, Manchester, on the manufacture and composition of resin and water gas, produced upon the system originally proposed by Count Val Marino in 1839, and revived by Mr. S. White in 1847. Without going into details, we contented ourselves by remarking, that the report completely demolished the absurd statements made by the last-named individual as to the economy of the process, though we accepted it with gratitude, under certain reserves, as a valuable contribution towards a more perfect elucidation of the chemical composition of illuminating gas, and of the matter upon which its illuminating properties principally depend.

The document has been subsequently somewhat roughly criticised in our columns by a chemical authority in no respect inferior to Dr. Frankland, and immeasurably superior to nine-tenths of the would-be chemists of the present day, who, having spent a few months at Geissen, or some German university, and paid their fees, are entitled to add Ph.D., or some such handle, to their names, and, in virtue thereof, assume a dictatorial tone towards all who doubt the infallibility of any of the theories of the Liebig school. We mean nothing disrespectful to Dr. Frankland, whom we have no intention of classing in this category, though we fear he has fallen into the common error of the German chemists, in too great a reliance upon isolated experiments, and, with the aid of pen and ink, making them fit preconceived theories. The rejection of the simple but unerring balance in determining the specific gravity of a gas, and the adoption of a series of calculations based upon a presumed knowledge of its constituents, is a practice which would have startled a Davy or a Wollaston, knowing, as they did, that all such analyses were liable to errors in the manipulation, even admitting the principles upon which they were founded to be unobjectionable; and yet the latter is acknowledged to be the system adopted by Dr. Frankland in determining the specific gravity of the resin and water gas.

A supplementary report, by the same gentleman, on coals and cannels, when similarly treated, will be found in another column, in which it is evident the writer has largely profited by the observations which have appeared in this journal upon his first report; and, in reducing the value of the hydro-carbon contained in any gas to the standard of olefiant gas, a more correct estimate of its value is obtained, though it is doubtful whether perfect accuracy is even now arrived at. Our readers will perhaps recollect that, so long ago as October, 1849, while pointing out the absurdity of the attempt to reintroduce resin as an economical material for the production of illuminating gas in this country, we directed Mr. White's attention to cannel coal, as a material far better suited to his purpose. We remarked that "any process for increasing the bulk of resin gas, by diluting it with hydrogen, may be applied with equal and even greater reason to cannel coal gas." We were told in reply, that we were the organs of the great coal-owners, whose property would be placed in peril should the new system be triumphant, and that we were consequently interested parties. Upwards of two years have since elapsed; and, if we are to credit the report now before us, our predictions are fulfilled to the letter.

We regret, however, our inability to confer upon the supplementary report that measure of approbation which we felt it our duty to bestow on the first. While correcting some sources of error, the writer has fallen into others more grave still, to such an extent as to render the document, in our judgment, unworthy of an experimentalist occupying the position of Dr. Frankland, and giving it more the character of an argument at *nisi prius* than an authoritative paper, by which posterity is to judge the writer as an analytical chemist. We will briefly point out some of these errors, leaving it to a future occasion to discuss their bearings more in detail.

The report is founded upon seven experiments with seven

different coals and cannels without water gas, and seven experiments in combination with water gas. There is consequently recorded a single experiment upon each material with water, and a single one without water, except in the case of the Boghead cannel, where there are two experiments with water gas, and of the Pelton coal, where no experiment is given in combination with water gas. In the former experiments on resin and water gas, as detailed in the first report, the *entire* of the gaseous products of each charge was collected, and samples taken from the bulk for the subsequent analyses. In the second series, with coal and water, an attempt is made to collect in a small gas-holder a *given proportion* of each cubic foot as generated, and the portion so collected is assumed to be a sample of the whole. Dr. Frankland thus describes the operation:—

"The samples of gases employed for testing the illuminating power and for analysis were collected in the following manner:—The main conveying the gas from the purifiers to the holder was tapped at a point just before it entered the meter, and a tube attached, leading to a graduated gasholder, capable of containing 80 cubic feet. The flow of the gas into this holder was so regulated by a stopcock, as to allow the admission of a certain per centage throughout the entire working; for instance, if a 10 per cent. sample was being taken, 10 feet entered this holder during the time that 90 feet passed through the meter. The per centages varied from three to 10 in the different experiments, but they were always made as large as the size of the holder rendered practicable; the volume of gas thus extracted was noted, and added to the quantity indicated by the meter. This method is much more convenient and accurate than when a large holder is employed, and the total quantity of gas operated upon; since a large holder, even when depressed to the greatest extent, must always contain a considerable quantity of gas from the previous operation, and thus the experiment is vitiated; whilst with a smaller vessel this residue can readily be got rid of by allowing a few cubic feet of the gas at the time generating to blow through it simultaneously with the collection of the first portion of the sample."

One would have expected to find some steps taken for ascertaining whether by such a process a sufficiently accurate average of the whole product could be abstracted, to serve as a stable basis for further argument. Fortunately, the materials are given us for such an examination. The seven trials with coal and cannel, uncombined with water, admit of being subjected to this ordeal, and are stated to have yielded the following results:—

| | Cubic feet of gas per ton. | Burner. | Consumpt. per hour. | Equivalent in 120-grain candles. |
|---|---|---|---|---|
| Wigan cannel (Ince-hall) | 10,900 .. | Fishtail .. | 3 feet .. | 13·9 |
| Do. (Balcarres) | 10,400 .. | do. .. | 3 feet .. | 10·9 |
| Boghead cannel | 13,240 .. | do. .. | 3 feet .. | 25·7 |
| Lesmahago do. | 10,620 .. | do. .. | 3 feet .. | 23·2 |
| Methyl do. | 9,580 .. | do. .. | 3 feet .. | 17·4 |
| Ramsay's do. | 10,300 .. | do. .. | 3 feet .. | 11·9 |
| Pelton coal .. | 10,800 .. | do. .. | 5 feet .. | 14·9 |

These values, taking quantity and quality into consideration, are expresed by the following weights of sperm candles as the equivalent of the gas from one ton of coals without water:—

| | |
|---|---|
| Wigan cannel (Ince-hall) .. .. | 865·8 lbs. |
| Do. do. (Balcarres) .. .. | 647·7 „ |
| Boghead do. .. .. .. | 1944·3 „ |
| Lesmahago do. .. .. .. | 1392·7 „ |
| Methyl do. .. .. .. | 952· „ |
| Ramsay's do. .. .. .. | 700·4 „ |
| Pelton coal .. .. .. .. | 527· „ |

Had such an examination been made by Dr. Frankland, he would have at once seen that his system was defective. Let him attempt to convince a Lancashire gas manager that Ince-hall cannel is 33 per cent. superiour to Balcarres cannel, and he will soon tell him he knows nothing about the matter. Or let him tell a London gas engineer that Pelton coal, when distilled in the ordinary manner, will yield 10·800 feet of gas per ton, of such a quality that the five-feet fishtail burner shall give a light equal to nearly 15 candles, and he will set him down as a fit inmate for Hanwell Asylum. The doctor seems to have been made aware that he had considerably undervalued Ramsay's Newcastle cannel, which he ascribes to the "inferior quality of the sample sent to him for investigation, or some other unknown disturbing cause;" to anything, in fact, but the true one, the impossibility of abstracting, by the means he adopted, a given portion of the gas as generated; an error which, while it would have accounted for the discordant results, would have demolished the whole superstructure of the report.

Another observation with regard to Ramsay's cannel is remarkable, and, if true, throws much doubt over the method adapted in the analysis of gas. The doctor says that Mr. Wright "has lately made a series of experiments, conducted with great care and accuracy, and states that this gas, with a flame consuming three feet per hour, produces a light equal to from 16·6 to 20 candles, and *this statement is perfectly corroborated by my own analysis of a specimen of the Western Company's gas, collected June* 15, 1851." Mr. Wright's most favourable experiment with the three-feet burner gave only 15·59 candles; and, if Dr. Frankland's analysis carries it up to 20 candles, the question naturally arises, what are such analyses worth?

We sincerely regret, for Dr. Frankland's reputation as an analytical chemist, that he should have abandoned the more certain method of collecting the whole of the gases produced, for one so uncertain as the system adopted by him in his recent experiments. How those upon Boghead cannel in combination with water were conducted is past our comprehension; as in one case 1908 feet, and in the other 2596 were produced; and we are asked to believe that one-tenth part of each, or 190·8 feet, and 253·6 were crammed into a gas-holder, the total capacity of which was 80 cubic feet. It may perhaps be that some portion of gas was allowed to escape from the gas-holder; but all such contrivances go towards swelling the sources of error, and render the result worthless as an experiment.

Our readers will bear in mind that, far from condemning the process as applied to coal or cannel, we, more than two years since, expressed ourselves strongly in its favour; but we refuse to place any faith whatever in results based upon experiments conducted in the loose and objectionable manner adopted in those under consideration, and must await more exact ones before we can form any opinion of the merits or disadvantages of the system.

Shareholders in gas companies must learn to bear with resignation the reductions in their dividends, which diminished profits may render necessary. A temporary difference of opinion on this point between the directors of the Chartered Gas Company and a small section of the shareholders has terminated in the loss of the services of George Wigg, Esq., the Governor, at a most critical period of its affairs, and to the unanimous regret of his colleagues. Unlike some gas companies, the Chartered has repudiated the system of maintaining their accustomed dividends, in the face of the late reduction of price, by resorting to the supply of an inferior article; and, as it is now the only free and unfettered gas company in the City of London, they are on the eve of profiting largely by the position they have in this respect assumed. Let us hope that the same wise policy will be pursued under the presidency of the new Governor, Benjamin Hawes, Esq.; and that, though all hope of a six per cent. dividend has vanished, five per cent. may be henceforward prudently maintained.

## Communicated Articles.

### THE CHEMISTRY OF GAS LIGHTING.

(*Continued from page* 224.)

The accompanying analytical table of the various coals mentioned therein will, for the present, close our investigations in this particular department, and thus permit us to enter upon a minute description of the different gaseous substances which, under the general expression "Volatile Matters," have hitherto occupied a position by no means commensurate with their importance. At a first glance, it may seem probable that the value of a coal for the purpose of the gas manufacturer could be inferred from the rates of the volatile products which it evolves; but this would be a great error, since amongst these products a quantity of oxygen passes off, for the most part combined with hydrogen, and constituting water, but also in combination with carbon, forming carbonic acid and carbonic oxide gases. Not only is it necessary, therefore, to deduct this oxygen from that part of the coal which is deemed valuable because volatile, but, in addition, great allowance must be made for the mischievous action of the oxygen in destroying or neutralising a considerable proportion of the really valuable gaseous matters. In proof of the necessity for making an allowance of this kind, we need do no more than allude to the well-known fact, that, whilst Newcastle coals, on the average, yield only about 10 gallons of water per ton of coal, some of those in the midland districts of England produce more than 30 gallons of the same fluid. One coal may, therefore, give off by distillation six or seven per cent. more volatile matter than another, and yet be inferior to this last in its amount of available gaseous constituents. As, however, the oxygen, during the manufacture of coal gas, combines very differently with the other products, according as the temperature is merely a dull red or verging on whiteness, we should impart no solid or useful information to the gas engineer by giving a tabulated statement

of the per centage of oxygen in the various descriptions of gas coal. The same end is much better gained, and a practical bearing secured, by confining our observations to those portions of the gaseous products which have an illuminative value; and hence we propose to rely upon the photometer as the basis of all our calculations, and show how far it keeps pace with the chemical constitution of the different gases now in use for the purpose of giving light. This subject will, however, occupy us with more propriety when detailing the methods of analysing coal gas: at present, we resume our observations on coal.

| Name of Coal. | General Character. | Volatile Matter. | Coke. | Ash. | Sulphur in | | | Ash in Coke per Cent. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Coal. | Coke. | Volatile Matter. | |
| West Hartley..... | Jet black, with thin dull laminæ in the direction of the principal fracture, and slight deposits of charcoal; fracture, slaty, cubical, inclining to conchoidal; cross fracture, cubical, with layers of carbonate of lime; streak, brown black. On the fire, splits and opens, but does not fuse. Ash, dull cream colour. Specific gravity, 1·269. | 35·8 | 64·2 | 4·7 | 1·1 | ·6 | ·5 | 7·3 |
| Hastings Hartley... | Jet black, laminated, and splintry; fracture, cubical, and slightly conchoidal; cross fracture, cubical and irregular; streak, black, with a shade of brown. On the fire, cracks and splits, with a trifling tendency to agglutinate. Ash, white, with red streaks. Specific gravity, 1·278. | 36·5 | 63·4 | 2· | ·95 | ·5 | ·45 | 3·1 |
| Gosforth..... | Coal black, with shining layers; fracture, irregular, inclining to cubical; cross fracture, cubical, with indications of charcoal; streak, dull black. On the fire, swells and agglutinates. Ash, dull yellow. Specific gravity, 1·260. | 35· | 65· | 1· | 1·1 | ·5 | ·6 | 1·5 |
| South Pearetн..... | Dull black, with bright laminæ, coarse grained; fracture, irregular, hackley, and inclining to cubical, with charcoal deposits; cross fracture, cubical; streak, dull black. On the fire, intumesces and fuses partially. Ash, light yellow. Specific gravity, 1·266. | 27·8 | 72·2 | 1·8 | 1·2 | ·6 | ·6 | 2·5 |
| Garesfield (Butes') | Coal black and rather friable, with thin bands of dark laminæ throughout; fracture, uneven and cubical; cross fracture, angular and hackley, containing traces of charcoal; streak, dull black. On the fire, swells and fuses together. Ash, light red. Specific gravity, 1·290. | 28·3 | 71·7 | 3·2 | ·9 | ·4 | ·5 | 4·4 |
| Garesfield(Cowans') | Coal black and shining, with thin dark laminæ; fracture, irregular and cubical; cross fracture, angular, and affording deposits of charcoal; streak, dull black. On the fire, agglutinates, swells, and partially fuses. Ash, pale cream colour. Specific gravity, 1·259. | 29·4 | 70·6 | ·95 | ·85 | ·4 | ·45 | 1·3 |
| South Tyne..... | Shining black, with dull laminæ; fracture, somewhat rhomboidal and irregular, with layers of charcoal and pyrites; cross fracture, angular; streak, dull brownish black. On the fire, agglutinates and swells slightly. Ash, deep pink. Specific gravity, 1·339. | 36·3 | 63·7 | 3·9 | 2·1 | 1·1 | 1· | 6·1 |
| Blenkinsopp ..... | Coal black; laminated; fracture, coarse and granular; cross fracture, splintry, inclining to cubical; streak, dull black. On the fire, fuses slightly and intumesces. Ash, grey. Specific gravity, 1·298. | 38· | 62· | 5·1 | 1·6 | ·8 | ·8 | 8·2 |
| Woodthorpe (South (Yorkshire) ..... | Compact, black, and uniform in appearance; resembles cannel coal; fracture, conchoidal; cross fracture, splintry and conchoidal, with layers of carbonate of lime; streak, black. On the fire, decrepitates slightly and splits, but does not fuse. Ash, dirty pink. Specific gravity, 1·347. | 33·1 | 66·9 | 10·5 | 1·2 | ·7 | ·5 | 16·6 |
| Soap House Pit (South Yorkshire).. | Dull black and slaty, with impressions of leaves; fracture, rough and hackley, inclining to conchoidal; cross fracture, irregular and angular. On the fire, splits, and then agglutinates and swells; streak, dull brownish black. Ash, light brown. Specific gravity, 1·258. | 35· | 65· | ·8 | ·75 | ·4 | ·35 | 1·2 |
| Mortomly (South Yorkshire) ..... | Coal black, with shining layers, in splintry fragments; fracture, laminated and cubical; cross fracture, cubical and irregular; streak, dull black. On the fire, splits and opens, but afterwards agglutinates and intumesces. Ash, light fawn colour. Specific gravity, 1·220. | 37· | 63· | 1·6 | 1·1 | ·6 | ·5 | 2·5 |
| Cumberland. No. 1. | Dull black, and coarse-grained; fracture, rough and hackley, inclining to cubical; cross fracture, slaty and angular; streak, dull black. On the fire, agglutinates and swells a little. Ash, dirty white. Specific gravity, 1·294. | 25·5 | 74·5 | 2·1 | 1·3 | ·7 | ·6 | 2·8 |
| Cumberland. No. 2. | Coal black, with dull luminæ; fracture, irregular, inclining to cubical; cross fracture, rough and angular, with charcoal deposits; streak, black. On the fire, swells and fuses slightly. Ash, grey. Specific gravity, 1·275. | 25·6 | 74·4 | 1·4 | 1·1 | ·6 | ·5 | 1·9 |
| Cumberland. No. 3. | Coal black and coarse-grained, semi-crystalline; fracture, hackley and angular, with layers of charcoal; cross fracture, irregular and angular; streak, brownish black. On the fire, swells and agglutinates. Ash, yellow white. Specific gravity, 1·290. | 30·9 | 69·1 | 4· | 1·7 | ·8 | ·9 | 5·8 |
| Ruabon. Nant Seam (N. Wales)..... | Shining black, and in columnar concretions; fracture, coarse and hackley, with charcoal deposits; cross fracture, rhomboidal and crystalline, with thin layers of carbonate of lime; streak, black. On the fire, agglutinates slightly and intumesces. Ash, cream colour. Specific gravity, 1·269. | 37·9 | 62·1 | 1·4 | 1·1 | ·7 | ·4 | 2·2 |

| Name of Coal. | General Character. | Volatile Matter. | Coke. | Ash. | Sulphur in | | | Ash in Coke per Cent. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Coal. | Coke. | Volatile Matter. | |
| Ruabon. Top Yard Seam (N. Wales) .. | Coal black, with shining layers, laminated; fracture, slaty and cubical, with charcoal deposits; cross fracture, cubical; streak, black. On the fire, swells and agglutinates. Ash, pale fawn colour. Specific gravity, 1·269. | 37·5 | 62·5 | 2·5 | 1·4 | ·8 | ·6 | 4· |
| Ruabon. Main Coal (N. Wales) ..... | Coal black and laminated; fracture, irregular, inclining to cubical; cross fracture, foliated and splintry, with numerous layers of charcoal, and some indications of iron pyrites; streak, dull black. On the fire, swells and fuses together. Ash, pale yellow. Specific gravity, 1·284. | 41·5 | 58·5 | 1· | ·85 | ·45 | ·4 | 1·7 |
| Ruabon. Yard Seam (N. Wales) ..... | Coal black, with dull laminæ; fracture, irregular, inclining to cubical; cross fracture, angular, with considerable deposits of charcoal, and thin layers of carbonate of lime; streak, dull black. On the fire, agglutinates and intumesces. Ash, fawn colour. Specific gravity, 1·271. | 34· | 66· | 1·4 | 1 1 | ·6 | ·5 | 2·1 |
| Rhonda Low Main (S. Wales) ..... | Colour, coal black, coarse grained and hackley; fracture, irregular and slightly cubical; cross fracture, rough and angular; streak, dull black. On the fire, intumesces and agglutinates feebly. Ash, pale red. Specific gravity, 1·280. | 23·1 | 76·9 | 2·1 | 2·2 | 1·1 | 1·1 | 2·7 |
| Nailsea (Somersetshire) ..... | Dull black, coarse-grained, and fibrous; fracture, hackley, inclining to rhomboidal, with numerous deposits of charcoal and iron pyrites; cross fracture, very irregular; streak, brown black. On the fire, swells and fuses together. Ash, flesh-coloured, with red streaks. Specific gravity, 1·312. (*To be continued.*) | 34·9 | 65·1 | 3· | 2·85 | 1·5 | 1·35 | 4·6 |

## THE CORPORATION OF LONDON AND THE GAS CONSUMERS.

The Common Council of the City of London, in its sitting on the 18th ult., agreed, in pursuance of the authority granted them by one of the clauses in the Great Central Gas Consumers' Act, to appoint a practical chemist for the purpose of testing the gas supplied by that company, and thereby ensuring, so far as may lay in their power, that its quality shall be in no respect inferior to the standard fixed by another of the clauses of the same act.

Our municipal body have by this resolution assumed an important but delicate duty; and upon the manner in which it is performed depends whether the measure is to become a really useful and efficient one, or whether, in bestowing the appointment upon some aristocratic professor, who has a host of other duties to perform, it may not lapse into a useless sinecure. We are aware that certain persons were named for this office in the original prospectuses of this company; but the adoption of any nominee of the company by the corporation would, we apprehend, be looked upon as a dictatorial interference with their independence, and derogatory to their dignity; indeed, when we recall to mind the exhibition of practical ignorance of the subject made by some of the parties, when under examination before the parliamentary committee sitting on the Great Central Bill, in 1850, we cannot for an instant believe such a nomination possible.

It is well known that we have invariably advocated the appointment of such an officer in all large towns. We have too often seen reductions in price followed by such a depreciation in quality as to render the light more costly. Four shillings per 1000 feet is now the Act of Parliament price for gas in the City of London; and its municipal body has undertaken to see that the quality shall not be inferior to the Act of Parliament standard. The office, if properly filled, will be no sinecure. Set trials, at stated or known periods, are a sham and a delusion. The telegraphic wire can be instantly set in action, and in ten minutes gas of any wished-for quality may be flowing through the 50 miles of pipes laid over the district. The corporation must appropriate an apartment at the Guildhall for the use of their officer, to which that officer must have access at all hours, making returns to the Court of all his experiments. Let whatever is done be perfectly independent of the company, or the citizens may derive little benefit from the measure.

We are informed that it has been proposed to nominate Mr. Lewis Thompson, the distinguished analytical chemist, if he can be prevailed upon to accept the office. Such an appointment would meet with general approbation. Unconnected with any parties or clique, he enjoys the confidence of all; and, though one respected by Faraday, Brande, and a host of illustrious explorers in the same field of science, needs no tribute from us, yet we cannot forbear publicly tendering him our thanks for the brilliant and original communications with which he has honoured our columns. The venerable Andrew Ure, whose Dictionaries of Chemistry and of Arts and Manufactures have become hand-books in every laboratory and workshop in Europe, thus expresses himself with reference to them, and to Mr. Thompson's fitness for the office about to be created:—

"London, January 5, 1852.

"Dear Sir,—I have perused with great pleasure the excellent contributions to your Journal on the chemical analysis of coal and coal gas, made by Mr. Lewis Thompson; and I regard them as the most ingenious, original, and accurate specimens of chemical investigation to be found in the annals of science.

"I have been given to understand that the Common Council of the City of London have resolved to appoint a chemist to execute analyses of the illuminating gases manufactured by the several coal gas companies; and I have no hesitation in declaring that I know no individual so well qualified as Mr. Thompson is, by skill, probity, and diligence, to perform the duties incident to such an office.

"I do not doubt that he will give perfect satisfaction to his employers and patrons, and I request that you will use any influence you may possess to promote his election.

"I remain, dear sir, yours very faithfully,

"Andrew Ure, M.D., F.R.S., &c."

To the Editor of the Journal of Gas Lighting.

## HISTORY OF THE MANUFACTURE OF WATER GAS.

Perhaps we could not at the present moment confer a more acceptable boon upon the majority of our readers than by giving a kind of synopsis or condensed history of what may be called "luminiferous water gas." The production of gas from water is a sufficiently antiquated experiment to have engaged the attention of Priestly, Lavoisier, Cavendish, and Black, the former of whom has been very justly styled "the father of pneumatic chemistry." Indeed, Newton, long ago, by the marvellous power of induction, inferred that water contained combustible matter, from its high refractive power; and perhaps it would be impossible to point out an instance in which more true courage has been displayed by any individual than in the avowal and promulgation of an opinion, which, at the period of its enunciation, seemed the very climax of absurdity and folly. That, however, which Newton never lived to see realised, is now becoming a large and important manufacture, and one which promises, in a literal sense, to throw light upon the whole world. Hence, in tracing its origin, we shall confine ourselves strictly to the application of water gas for the purposes of illumination, and not dwell upon the decomposition of water for other objects. This, of course, had been done even before the commencement of the present century, much in the same way now practised, that is, by passing the vapour of water over red-hot iron, charcoal, or coke; and somewhat later we find this process conducted on a pretty large scale for the inflation of balloons, so that, in reference to the mere manufacture of hydrogen and carbonic oxide, or of hydrogen alone, from water, there is no room for anything patentable. But the application of these gases as a means of illumination evidently opened out a wide field for the investment of ingenuity, and the labourers have been neither few nor unsuccessful. Curiously enough, however, it will be noticed as we proceed that the earliest attempts were made under a system diametrically opposed to that by which alone success is possible, and the true principles have at length become developed, no less through a process of exhaustion than by the application of science.

The first employment of water gas for the purposes of illumination seems to be contained in the patent of Michael Donovan, dated October 6, 1830. In this patent Donovan sufficiently indicates the production of hydrogen and carbonic oxide gases from water and red-hot coke, or charcoal, but he scarcely goes farther than the naphthalising of these gases by various volatile hydrocarbons, and does not appear to have contemplated their employment in the making of coal gas, nor to have been aware that any advantage might be thus gained. In his own words Donovan's invention "consists in giving to

certain inflammable gases a luminous power which they do not possess in their natural or pure state, and this is done by combining them with carbon. The gases mentioned are hydrogen, carbonic oxide, and the gas produced by passing water or steam over red hot coke, &c." But the patentee goes on to say, "in order to give a higher degree of luminous power to these gases, it is necessary to unite them chemically with carbon in a state of vapour, and this is proposed to be done by combining them with the vapour produced from a combustible distillation of such substances as turpentine, or the resinous parts of coal tar or naphtha." It is difficult to say how far this may be regarded as a development of the idea subsequently patented by Val Marino; but, remembering that Donovan was a chemist, it certainly seems as if he contemplated something more than the single naphthalisation of water gas by volatile hydrocarbons, placed near the burner, and in the current of the gas. This notion is, moreover, strengthened by his claim, in which, after describing one mode of giving luminosity to hydrogen and water-gas, he says, "in this way, or in any other way that may be found convenient, the patentee proposes to give carbon, or other illuminating properties, to pure hydrogen or any other gas, which, though combustible, burns with a dim or pale light."

This patent of Donovan was speedily followed by the more practical one of Lowe for naphthalising coal gas, but having no special reference to water gas. Lowe's patent is dated June 9, 1832. It is not till seven years after, viz., on May 8, 1839, that we again find water gas made the subject of a patent. This is the invention of Edward Manby, and here, unquestionably, lies the first practical attempt to apply water gas during the distillation of coal. The patent is described as being for "a new invention of manufacturing gas for the general purposes of illumination," and, as heretofore, we give the words of the patentee, so far as they apply to the question at issue:—"The new method of manufacturing gas for the purposes of illuminations, consists in passing steam into a retort, or closed vessel, containing anthracite, or stone coal, charcoal, coke, or bituminous coal, heated as hereinafter mentioned, and thereby obtaining a gas or combination of gases applicable to the purposes of illumination. The manner in which the same may be performed will be more particularly described by referring to the drawing annexed. A cylindrical retort, A, about 8 or 10 inches in diameter, is placed vertically, and with its lower end curved outwards, to facilitate the discharging its contents: this end is fitted with a lid, or cover, in the way in which covers are usually fitted to gas retorts." The description is continued in the same manner until the whole of the apparatus has been alluded to, after which the mode of generating the gas is detailed as follows:—"The retort is first heated to a lively red heat, the same as for the distillation of gas from coals, then quickly charged with the material to be used for producing gas, and the heat is continued the same during the operation as is usual with retorts in the common manufacture of gas. To facilitate the action of the steam, the anthracite, or other substances respectively, are mixed with a mixture consisting of one part of slaked lime, nine parts of siliceous sand, and one part of clay, if the sand does not already contain clay in the requisite proportion. The quantity of steam let in must vary with the proportion of carbon contained in the anthracite or other matter employed, and a small test burner should be used; for, if the illuminating power of the gas diminishes, the quantity of steam entering the retort should be lessened." The patentee concludes by saying:—"I have thus described the apparatus found convenient in carrying into effect my invention; but it is obvious that the principle of that invention does not depend upon the particular form, size, or position of the retorts, or closed vessels, in which the gas is generated, or of the boilers supplying the steam, or of the other apparatus. These may be varied to a very great extent; but that which I claim as my invention is the manufacturing of gas for the purposes of illumination by passing steam into a retort, or closed vessel, containing anthracite, or stone coal, or culm, charcoal, coal, coke, or bituminous coal, heated to the temperature hereinbefore described." The careful definitions and comprehensive nature of this claim seem to indicate that Mr. Manby had made himself well acquainted with the advantages of water gas, though the apparatus he describes is probably imperfect in respect to the extent of its decomposing surface; but this, of course, might easily be remedied within the provisions of his claim. Nevertheless, as it is detailed, there can be no doubt that here, with more or less accuracy of outline, stands developed the idea of increasing the quantity of illuminating gases to be procured from a given proportion of coal by the application of water gas; and here, also, we find the test burner for regulating the supply of water or steam, and the notion of using lime with the ingredients for decomposing the water.

Next in the order of succession comes the very remarkable patent of Val Marino, bearing date June 22, 1839. This invention is divided into two parts, and relates, firstly, to "an improved method of manufacturing gas for the purpose of light, from coal, or other tar, or oils, and other fatty substances, in combination with water;" secondly, it relates to a particular construction of burner, which, as this is not within our province at present, we pass over, and, as usual, give the words of patentee for the rest:—"The first part of this invention has for its object the more or less perfect decomposition of tars, oils, and other fatty matters, and water, by means of which a more perfect combination of the gases evolved, and, consequently, a more beneficial result will be obtained. The nature of the apparatus is such that the tar, oil, or other fatty matters employed is completely decomposed by being exposed to highly-heated surfaces of charcoal or coke, and the water is also completely decomposed in suitable vessels. The products arising from the decomposition of the water are brought into a highly-heated retort, or other vessel, filled with coke or charcoal, wherein the process of decomposing the oil, tar, or fatty matter is going on; and such is the chemical action and reaction of the gases upon each other, that the carbon contained in the tar, oil, or fatty matter, becomes fully saturated with hydrogen; and the whole, or very nearly the whole, of the carbon is thereby obtained in the state of carburetted hydrogen gas. It is well known that, when different oils or tars are decomposed, they evolve different properties of hydrogen, oxygen, and carbon; and hence they will consequently require the decomposition of more or less water to make up the deficiency of hydrogen or oxygen, in order to perfectly saturate the carbon, so as to produce a gas that will be serviceable. It is, therefore, necessary to know how much water it will require for each kind of tar, oil, or fat. Chemical works, which give the composition of the different tars, oils, and fats, may be consulted; but in practice it is better done as shown in the description of apparatus subjoined. Three vertical retorts are to be used, A, B, and C; one for decomposing water, another for continuing the decomposition of the products of water, and the third for decomposing the oil, tar, or other fatty matter. All the retorts are filled with coke or charcoal; and it is not of any material consequence which of the retorts are employed for the separate duties, as they are all similarly constructed; but in the arrangement shown in the drawing, A is the retort for decomposing water; B is that for the decomposition of the oil, or tar; and C is that for the further decomposition of the gases evolved from A. The object of the arrangement is to fully decompose the water, before the products thereof come into B. E is a vessel placed above, and containing tar, oil, or other fatty matter; D is a similar vessel, containing water; F, F, are syphon pipes, furnished with stop-cocks, and communicating with the vessels, D, E, and with the retorts, A, B. In order to arrange the apparatus to perform the decomposing process with precision, so that a proper quantity of water may be decomposed in proportion to the quantity of tar, oil, or fatty matter, it will be necessary to have a burner near the retort, and in sight of the workman, by which means he will, from time to time, observe the result of the operation; and, if the flame of the burner becomes more coloured than is proper, it will indicate a deficiency of water, and *vice versâ*." The patentee states that he "usually employs coal tar; but he does not confine himself to this, nor to the particular arrangement of apparatus shown. His claim is for the mode of manufacturing carburetted hydrogen gas from tar, oil, or other fatty matters, as before described, which is by completely decomposing the water before the products thereof are permitted to enter into that portion of the apparatus wherein the tar, oil, or other fatty matter is decomposed."

What we have particularly to notice in this patent is the stress laid upon the necessity for the complete decomposition of the water before its passage into the retort containing the tar or oil. That this indispensable condition to success was well known by Val Marino is abundantly clear, and therefore to him is justly due the merit of first pointing out, in a practical way, the conservative power of hydrogen gas, and the mischievous action of aqueous vapour. So far as his means permitted, Val Marino carried the manufacture of "luminous water gas" to an extent of perfection never dreamt of by his predecessors, and seemingly not known to, or appreciated by, any but the last of his successors. Singular, too, as it may appear, the apparatus of Val Marino for effecting the complete decomposition of water, though by far the most perfect contrivance ever invented for this purpose, seems incapable of effecting its object under the most favourable circumstances; and recent experiments have served to show that the decomposition of water by charcoal, coke, or iron, is due less to the affinity of these substances for oxygen, than to the principle of diffusion. However small the current of steam may be in reference to the surface of charcoal, a certain amount of it always passes undecomposed through the retort; or, in other words, the hydrogen produced in the first instance exercises upon the remaining steam a conservative action, similar to that which it is known to have with various hydro-carbons. It prevents the total decomposition of the steam; and therefore, although correct in theory, Val Marino was wrong in practice, for, unknown to himself, he did allow steam to enter the retort employed for decomposing the tar and oil. As we before stated, with a single exception, not one of those who have followed Val Marino (and many have done so most slavishly) has either remedied this defect, or seen, as Val Marino did, the indispensable necessity of keeping steam out of the retort evolving the luminous gases.

The next patent of this kind is that granted to Mr. Radley, and bearing date May 3, 1845. This is not only a monster patent, but in many respects a monster absurdity, more especially coming, as it does, after the clear and scientific specification of Val Marino.

We remember to have heard of a Scotch preacher who divided his sermon into heads, and was commencing "fortiethly" when his exhausted hearers fled in despair. Mr. Radley is almost equally voluminous, for his claims extend over several sheets of parchment, and end by a "twenty-secondly," which we forbear to quote, as it does not refer to the subject in hand. There is, however, really nothing novel in this patent concerning water gas, unless it be the employment of a "revolving sphere, completely filled with a mixture of hard lumps of quicklime, coke, and scrap iron;" and lastly, the discovery of some unknown compounds, called "hydruret and binhydruret of acetule." The mode of combining the steam and the illuminating gases is a step very far in arrear of Val Marino, and must have the effect of destroying whatever photogenic power the mixture might otherwise possess. The steam and the volatile constituents of the tar are made to meet in the "revolving sphere" at a bright-red heat, and with a surface of lime, coke, and scrap, so large as to ensure the mutual decomposition of the water and luminous vapours into hydrogen, carbonic oxide, and light carburetted hydrogen. Following Manby, a test burner is to be employed to regulate the amount of water used. The twenty-first claim, which has reference to this part of the invention, is as follows:—"I claim the method of resolving animal, vegetable, or mineral tar, by means of the vapour of water, assisted by the materials and apparatus hereinbefore set forth, into bicarburet of hydrogen of various densities." This, then, may be said to complete the circle, if it is not actually an infringement of Val Marino's patent. First, we have Donovan, with water gas applied to hydrocarbon vapours, and something more not clearly expressed; secondly, Manby, with water gas and steam applied to coal; thirdly, Val Marino, with water gas conjoined to tar, oil, and fatty matters; and, lastly, Radley, with steam alone, in conjunction with tar.

Under the date, April 15, 1847, we find White's first patent, of which we need say no more than that it is a simple copy of Val Marino's specification, with a little of the lime and scrap iron idea from Manby and Radley. It would be waste of argument to follow out the obvious plagiarisms in this patent; we, therefore, prefer to lay the salient points before our readers in the words of the patentee himself, and this we do, rather because this patent is supposed to give support to a subsequent one by the same individual, than from any intrinsic value it possesses:—

"The improvements relate to the manufacture of combustible gas for the purposes of illumination, and consist, first, in the materials to be employed in such manufacture; and, secondly, in the apparatus or means by which the gas is to be generated." The patentee proposes to manufacture and employ, for the purposes of illumination, certain combinations of gases, having higher illuminating power than that usually employed. He proposes to manufacture hydrogen and oxide of carbon gas by the decomposition of water in a retort maintained at a high degree of heat, in contact and in connection with charcoal, coke, or anthracite coal, and iron plates, or sheets, or wires, in small and divided pieces; and afterwards combining the said gases, hydrogen, and oxide of carbon, with carburetted hydrogen, generated from the decomposition of oil, fat, tar, or other similar substances in separate retorts, thereby producing a compound of highly-inflammable gases, in a state sufficiently pure for the purposes of illumination, without the necessity of the employment of purifying apparatus. The apparatus employed by the patentee for the generation of the gases is of the following description:—

"A cylindrical retort is placed vertically within a furnace of the usual construction; the retort is provided with caps or covers, both upon the upper and the lower extremities, the upper opening being for the purpose of charging the retort with the necessary materials, and the lower one for extracting the contents when requisite; this retort is for the purpose of generating the hydrogen and oxide of carbon gases; from the lower part of the retort a pipe forms a communication with another circular retort similarly situated, in which is generated the carburetted hydrogen gas. The generation of the gas is effected in the following manner:—The first retort, that in which the hydrogen and the oxide of carbon gases are generated, is filled, to the extent of about three-fourths, with charcoal, coke, or other similar substances, broken into small fragments, enclosing in the midst of the retort a colander, or perforated cylinder, containing a quantity of scraps or pieces of plate, or sheet, or hoop-iron, or of iron wire; if sheet or hoop-iron is employed, the patentee recommends the pieces to be about three or four inches long, one and a half in breadth, and one-tenth in thickness; and if wire, in lengths of about three or four inches, by one-tenth of an inch diameter. Above the top of the mass of materials within the retort is a perforated metal basin or vessel, for the purpose of receiving the water from a feeding pipe, and distributing it over the surface of the mass of materials, which it penetrates a short distance; but by the heat at which the retort is to be maintained, namely, a white heat, it is quickly converted into vapours of hydrogen, oxide of carbon, and carbonic acid. There being no outlet for the generated gases from the upper part of the retort, they descend through the mass of materials to the lower part of the retort, and then escape by the communication-pipe to the other retort. The generated gases, in passing through the mass contained in the retort, are purified by the absorption of the carbon acid gas, leaving the hydrogen and oxide of carbon wholly or nearly pure. The other retort, for the generation of the carburetted hydrogen, contains a peculiar apparatus for facilitating the process of generation; from a hook, fixed to the under side of the upper cap or cover of the retort, is suspended an iron rod descending a considerable distance down the centre of the retort; to this rod are attached short pieces of small chains lying one over the other, and radiating from the centre and downwards, forming appearances of cones, having their apices at the centre of the rod; these chains occupy about two-thirds of the contents of the retorts. Above the mass of chains, and attached to the rod, is a vessel having a number of small rods or pins radiating from the centre, for the purpose of receiving and distributing to all parts of the mass of chains the necessary supply of materials for the generation of the carburetted hydrogen, from a suitable vessel or reservoir. A proper supply of oil, fat, tar, or other similar substance is conveyed by the feeding-pipe to the interior of the retort, where it is distributed in small and minute drops upon the mass of chain, when it is decomposed, and carburetted hydrogen gas is generated, and, descending, enters into combination with the hydrogen and the oxide of carbon gases from the other retorts; the compound gas then passes from the lower part of the retort by a pipe to a reservoir below, from whence the gas passes through a common condenser-pipe, and the gas is then in a state fit for combustion, being sufficiently pure without the necessity of subjecting it to the action of purifiers as usual. The patentee also proposes the use of lime within the colander, or perforated cylinder, in the retort, instead of the iron plates or wires, but he prefers the use of the iron plates or wires. The patentee states the temperature at which the retorts should be maintained to produce the best effect to be—the retort for generating the hydrogen and oxide of carbon to be a white heat, and the one for the generation of the carburetted hydrogen to be a bright red heat. The patentee claims the mode of decomposing water by the use of charcoal, coke, or anthracite coal as an agent, and generating thereby hydrogen and oxide of carbon gas, as also the method described above of producing hydrogen and oxide of carbon gas combined, freed, or nearly freed, from carbonic acid gas, by passing the gases, as generated from the decomposition of the water, through charcoal, coke, or anthracite coal, and iron plates, or sheets, or iron wire, or lime heated to a high temperature, and the combination of the said purified hydrogen and oxide of carbon gases with carbonated hydrogen, generated by the decomposition of oils, fatty matters, tar, or other similar substances."

It is superfluous to add, that Val Marino's claim embraces substantially all this; and impressed, probably, with the utter want of originality so very visible in his first patent, we find Mr. White shortly after applying for another, which was granted on March 26, 1849—he himself having, meanwhile, risen from the titular dignity of "a clerk" to that of "a gas engineer." As heretofore, we shall do our best to give the *ipsissima verba* of the patentee. "This specification relates to the manufacture of gas for the purposes of illumination, and consists in improvements upon a former invention of the present patentee, contained in a specification of a patent granted to him in 1847. The invention there described is for the production of gas for illuminating purposes, and the construction of apparatus for producing it. The present specification describes a modified arrangement of construction in the apparatus, and is illustrated by an accompanying drawing, which represents a side view of a retort furnace partially shewn in section, for the purpose of giving a view of the retorts within them. A, the brickwork within which the retorts, B, B, are placed in a vertical position immediately over the fireplace of the furnace, the door of which is at C." Central flues or passages are provided in the retorts, by which they are said to be maintained at a more equable temperature. These retorts contain a quantity of coke, or charcoal, or other similar materials, broken into small pieces, or mixed with a quantity of pieces, or hoops, or thin plates of iron. In other respects there is a close analogy to Val Marino's patent; the same "two cisterns, or vessels, placed upon the top of the furnace for containing tar and water, the same pipes with stop-cocks to regulate the supply, and communicating respectively with the water gas and tar gas retorts." The sole novelty is the introduction of chains into the retort for decomposing the tar or oil, in place of the coke used by Val Marino. In this patent, however, Mr. White alludes to the use of a purifying apparatus, which was deemed superfluous in the first patent. As regards the action of the apparatus, it is thus described, the retorts being first raised to the requisite temperature:—"Water is supplied to the vertical retorts in a succession of drops or in a small stream, dependent upon the size of the retorts. This water, spreading amongst the mass of coke and iron in the retorts, is speedily converted into vapour, which vapour descends through the coke and iron, and passes into the lower compartment of the horizontal retorts in the shape of hydrogen and carbonic oxide gases. It is now combined in these retorts with carburetted hydrogen, generated from resin, tar, or other substances, passed into these retorts by the pipes before alluded to; the metal chains within these retorts facilitating the production of the gas, and its combination with the other gases from the other retorts. After traversing the compartments of the retorts, the gases pass into the hydraulic main, and thence through purifiers to the gasometer in the usual manner." The claim made

relates solely to the construction of the furnaces and retorts, and is as follows:—"I claim the particular arrangement and construction of the furnaces and apparatus shown and described for the production of gases, and particularly the construction of the retorts, with one or more divisions longitudinally within them, and extending the length of the heating surface of the retorts, in contact with which surface the generation of the carburetted hydrogen gas, and likewise its combination with hydrogen and oxide of carbon gas, take place." Nothing whatever is claimed respecting materials, nor do we see either how such a claim could be supported, or even how the one made can be sustained, seeing that retorts with one or more longitudinal divisions in them had been used in many works in the manufacture of gas for upwards of 20 years previously.

*(To be continued.)*

## REPORT ON THE MANUFACTURE, COMPOSITION, AND ILLUMINATING POWER OF HYDRO-CARBON GAS.

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### PART II.

### WHITE'S PROCESS APPLIED TO COALS AND CANNELS.

The following experiments were conducted in the same works, and with the same apparatus as those on the process applied to resin, and described in the former part of my report:—

In order to obtain a fair comparison of the results yielded by the various coals when distilled alone (as in the usual process of gas making) with those obtained from the same coals when treated with water gas, according to the hydro-carbon process, each coal was distilled, first by itself, and then with the addition of water gas, equal weights being used for each experiment; but, as smaller quantities of gas were produced in these experiments than in the previous ones on resin, it was necessary to avoid any error which might arise from intermixture of the gases filling the small refrigerator, purifiers, &c., between the retorts and the holder, previous to the commencement of each operation, and, therefore, the capacity of these vessels was determined, and a quantity of gas considerably greater than requisite to fill them, and made under the same circumstances as that in the succeeding experiment, was passed through them before each trial commenced. The plan of clearing out the vessels and pipes was found to answer perfectly, on testing it by passing alternately similar quantities of Wigan cannel gas and water gas through them, and noticing the number of feet indicated by the meter, before the flame of a test burner, coming from the ingress pipe near the meter, fully assumed the illuminating power of the gas which was being produced.

This precaution being adopted, each experiment was commenced by charging one of the retorts with one cwt. of coal or cannel, which was distributed nearly equally between the upper and lower divisions; the lid being then replaced as quickly as possible, the distillation was continued, either with or without the addition of water gas, until all volatile matters were expelled from the coal retort. The water gas was produced, as usual, by allowing a thin stream of water to fall upon charcoal, heated to full redness, in a separate retort. This gas, along with the excess of steam, then passed into the lower division of the coal retort, sweeping, in its course, the gases forming in both the lower and upper divisions rapidly into the hydraulic main, and producing in its passage an additional quantity of water gas by the action of the steam upon the coal tar. The production of the water gas was so regulated as to be most rapid at the commencement of the experiment, and then gradually to decline to its close.

For the purification of the gases nothing more was used than two small purifiers, the one containing wet and the other dry lime; but on a large scale arrangements ought to be made for removing ammonia as well as sulphuretted hydrogen. There is, however, no constituent contained in the gases made by the hydro-carbon process, applied to coals, which requires means of purification different from those commonly used in all gas works.

The samples of gases employed for testing the illuminating power and for analysis were collected in the following manner:—The main conveying the gas from the purifiers to the holder was tapped at a point just before it entered the meter, and a tube attached, leading to a graduated gasholder, capable of containing 80 cubic feet. The flow of the gas into this holder was so regulated by a stopcock, as to allow the admission of a certain per centage throughout the entire working; for instance, if a 10 per cent. sample was being taken, 10 feet entered this holder during the time that 90 feet passed through the meter. The per centages varied from three to 10 in the different experiments, but they were always made as large as the size of the holder rendered practicable: the volume of gas thus extracted was noted, and added to the quantity indicated by the meter. This method is much more convenient and accurate than when a large holder is employed, and the total quantity of gas operated upon; since a large holder, even when depressed to the greatest extent, must always contain a considerable quantity of gas from the previous operation, and thus the experiment is vitiated; whilst with a smaller vessel this residue can readily be got rid of by allowing a few cubic feet of the gas at the time generating to blow through it simultaneously with the collection of the first portion of the sample.

A rather low heat was employed in all the experiments, as it was found to be the best, as well for the coals alone as with water gas; and the results obtained in the trials without water gas will rarely be found below those of other experimenters.

The temperature of the gases, on reaching the meter, was found to be no higher than that of the external atmosphere. The greatest care was taken to secure accuracy in the results, and perfect fairness in the comparison between the coals distilled alone and with water gas. All the weighings were made in my presence, and every experiment from beginning to end was conducted under my own personal inspection.

The illuminating power was tested by Bunsen's Photometer, a large number of the experiments being made with an improved form of the instrument, invented by Messrs. Church and Mann, of the City Gas Works, London. In some instances the shadow test was also tried. The size of burner and pressure of gas were in most cases noted, and in every instance the determination of illuminating power was made when the gas appeared to be burning to the greatest advantage—that is, without a flickering flame or a tendency to smoke. These experiments are, however, even with the greatest care, subject to certain errors, caused principally by the irregular burning of the spermaceti candle, which renders them only approximative. The liability to these errors has, it is true, been much reduced by the ingenious plan of substituting a jet of gas for the candle, as proposed by Mr. King and Mr. Wright; yet the impossibility of accurately ascertaining the consumption of the candle at the moment when the gas jet is made equal to it renders the experiment still liable to small inaccuracies. The following results are all corrected to those which would have been obtained by using a sperm candle burning 120 grains per hour; and one of these candles burning, for 10 hours, is taken as the standard with which to compare the total quantity of light yielded by a given volume of gas; thus, when it is stated, that the total quantity of gas produced from one cwt. of coal, when burned at the rate of five feet per hour, is equal in illuminating power to 546 candles, it is intended that the light afforded by the gas is equal to that yielded by 546 sperm candles, each burning 10 hours, and at the rate of 120 grains per hour.

The analyses of the various gases were, in all cases, made over mercury, according to the methods which I have fully detailed in the "Journal of the Chemical Society" (vol. II., p. 269, June, 1849), with this difference, that a new form of apparatus was employed, which will be elsewhere described. This instrument much shortens the processes, without rendering them less accurate. The volume of the gases was always read off when they were saturated with watery vapour; the proper correction was afterwards made for this, and the per centage numbers given below, as well as those in the first part of this report, refer invariably to the gases free from watery vapour. The carbonic acid was determined by caustic potash, the oxygen by Liebig's new method, viz., by absorption with a solution of pyro-gallic acid in caustic potash,* and the illuminating hydro-carbons by strongly fuming sulphuric acid. I have stated in the former part of this report that the mere determination of the volume of these hydro-carbons, whether this be by chlorine or by fuming sulphuric acid (for both these materials, if light be perfectly excluded during the operation of the chlorine, condense precisely the same ingredients), gives us no information respecting their value as illuminating materials; for as these hydro-carbons are very variable in their composition, and as their value depends upon the quantity of carbon contained in a given volume, it can only be determined by ascertaining the amount of carbonic acid which one volume of these hydro-carbons is capable of producing. This can readily be done by exploding known volumes of the gas with oxygen before and after the absorption of the illuminating materials, and measuring the carbonic acid produced in each case. If we then multiply the per centage amount of hydro-carbons by the number of volumes of carbon vapour contained in one volume of these hydro-carbons, and divide the product by two, we have their value expressed in volumes of olefiant gas, each volume of which contains two volumes of carbon vapour, and generates, on explosion with oxygen, two volumes of carbonic acid.

The necessity for this valuation will be evident when I state that one volume of the hydro-carbons absorbable by chlorine, or fuming sulphuric acid, contains quantities of carbon vapour, varying from 2·54 volumes to 4·36 volumes; from which it appears, that two gases undergoing the same amount of condensation, by the chlorine or sulphuric acid tests, might still differ in illuminating power, to the extent of more than 71 per cent.

In his very carefully-performed experiments on the gases produced from Boghead and Lesmahago cannels, Dr. Fyfe found that their illuminating power was nearly equal, although the quantity of hydro-carbons contained in the Boghead gas, as shown by the chlorine test, was 27 per cent., whilst the Lesmahago gas contained only 17·6 per cent.; and Dr. Fyfe suggested that this equality of light might be owing to our not being yet acquainted with the method of burning rich gases to advantage; but, on determining

* Bisulphuret of carbon vapour, and the other ingredients present in coal gas, were found to have no influence upon the absorption of oxygen by this solution.

the quantity of carbon contained in equal volumes of the Boghead and Lesmahago hydro-carbons, I find that 17·6 volumes of the Lesmahago hydro-carbon contain nearly as much carbon as 27 volumes of the Boghead hydro-carbon, which satisfactorily demonstrates this to be the cause of the equality in illuminating power.

The following are the results of the experiments:—

### WIGAN CANNEL (INCE HALL).

#### 1. WITHOUT WATER GAS.

Cannel used .. .. .. .. 1 cwt.
Gas produced .. .. .. .. 545 cubic feet.
Coke left .. .. .. .. 74 lbs.
Time occupied .. .. .. .. 3h. 20m.

ILLUMINATING POWER OF GAS.

| Shadow Test. | 2 c. ft. per hour. | 3 c. ft. per hour. | 4 c. ft. per hour. | 5 c. ft. per hour. |
|---|---|---|---|---|
| ·5 cubic feet per hour. = 1 candle. | Fish-tail, No. 1. Pressure ·2 in. = 8·77 candles | Fish-tail, No. 1. Pressure ·4 in. = 13·9 candles | Fish-tail, No. 2. Pressure ·6 in. = 18·0 candles | Fish-tail, No. 4. Pressure ·5 in. = 22·1 candles |

Total gas produced, when burnt at 5 feet per hour, yields light = 240·8 sperm candles.

PER CENTAGE COMPOSITION OF GAS.

| | | |
|---|---|---|
| Hydro-carbons and olefiant gas | 10·81 | = 15·13 olefiant gas. |
| Light carburetted hydrogen .. | 41·99 | |
| Hydrogen .. .. .. | 35·94 | |
| Carbonic oxide .. .. | 10·07 | |
| Carbonic acid .. .. .. | 1·19 | |
| Nitrogen } traces .. .. | „ | |
| Oxygen } .. .. | „ | |
| | 100·00 | |

Amount of carbonic acid generated by 1 volume of hydro-carbons, &c., condensed by fuming sulphuric acid = 2·8 volumes.

ACTUAL CONSTITUENTS.

| | | |
|---|---|---|
| Hydro-carbons and olefiant gas | 58·05 | = 81·27 olefiant gas. |
| Light carburetted hydrogen .. | 225·48 | |
| Hydrogen .. .. .. | 193·00 | |
| Carbonic oxide .. .. | 54·07 | |
| Carbonic acid .. .. .. | 6·39 | |
| Watery vapour * .. .. | 8·01 | |
| | 545·00 | |

#### 2. WITH WATER GAS.

Cannel used .. .. .. .. 112 lbs.
Gas produced .. .. .. .. 806 cubic feet.
Coke left .. .. .. .. 68 lbs.
Time occupied .. .. .. 3h. 20m.

ILLUMINATING POWER OF GAS.

| Shadow Test. | 2 feet per hour. | 3 feet per hour. | 4 feet per hour. | 5 feet per hour. |
|---|---|---|---|---|
| ·575 cubic feet per hour. = 1 candle. | Fish-tail, No. 3. Pressure ·7 in. = 8·6 candles | Fish-tail, No. 2. Pressure ·5 in. = 13·7 candles | Fish-tail, No. 2. Pressure ·6 in. = 15·8 candles | Fish-tail, No. 4. Pressure ·5 in. = 20·0 candles |

Total gas produced, when burnt at the rate of 5 feet per hour, yields light = 322·4 sperm candles.

PER CENTAGE COMPOSITION OF GAS.

| | | |
|---|---|---|
| Hydro-carbons and olefiant gas | 10·55 | = 13·72 olefiant gas. |
| Light carburetted hydrogen .. | 27·20 | |
| Hydrogen .. .. .. | 47·39 | |
| Carbonic oxide .. .. .. | 14·86 | |
| Carbonic acid .. .. .. | 0·00 | |
| Oxygen and nitrogen traces .. | „ | |
| | 100·00 | |

Amount of carbonic acid generated by one volume of condensible hydro-carbons = 2·60 volumes.

ACTUAL CONSTITUENTS.

| | Cubic feet. | Cubic feet. | |
|---|---|---|---|
| Hydro-carbons and olefiant gas | 83·77 | = 108·9 | olefiant gas. |
| Light carburetted hydrogen .. | 215·97 | | |
| Hydrogen .. .. .. | 376·28 | | |
| Carbonic oxide .. .. .. | 117·99 | | |
| Watery vapour .. .. .. | 11·99 | | |
| | 806·00 | | |

Hence,—

| | Per Cwt. | Per Ton. | Per Cent. |
|---|---|---|---|
| Gain in illuminating power by the employment of water gas .. | 81·6 candles. | 1632 candles. | 33·9 |
| Gain in olefiant gas .. | 27·63 c. ft. | 552·6 c. ft. | 34 |
| Gain in quantity of gas | 261 „ | 5220 „ | 47·9 |

* It was found quite impossible to determine the quantity of watery vapour contained in each gas as it passed through the meter, since the temperature of the gas, and the degree of saturation, were subject to variations during each experiment; a mean amount of 1·47 per cent. has, therefore, been assumed as the watery vapour present in each case. Although this number is not absolutely correct, it is more than sufficiently so for all practical purposes.

### BOGHEAD CANNEL.

#### 1. WITHOUT WATER GAS.

Cannel used .. .. .. .. 112 lbs.
Gas produced .. .. .. .. 662 cubic feet.
Coke left .. .. .. .. 36 lbs.
Time occupied .. .. .. .. 2h. 55m.

ILLUMINATING POWER OF GAS.

| Shadow Test. | 1 foot per hour. | 2 feet per hour. | 3 feet per hour. | 5 feet per hour. |
|---|---|---|---|---|
| ·325 cubic feet per hour. = 1 candle. | Fish-tail,* Pressure ·9 in. = 6·48 candles. | Fish-tail. Pressure 1·2 in. = 14·4 candles. | Fish-tail, Pressure ·6 in. = 25·7 candles. | Winfield's Button-burner. = 59·6 candles. |

Total gas produced, when burnt at the rate of 3 feet per hour yields light = 567 sperm candles.

PER CENTAGE COMPOSITION OF GAS.

| | | |
|---|---|---|
| Hydro-carbons and olefiant gas | 24·50 | = 31·11 olefiant gas. |
| Light carburetted hydrogen .. | 58·38 | |
| Hydrogen .. .. .. | 10·54 | |
| Carbonic oxide .. .. .. | 6·58 | |
| Carbonic acid .. .. .. | 0·00 | |
| | 100·00 | |

Amount of carbonic acid generated by one volume of hydro-carbons condensed by fuming sulphuric acid = 2·54 volumes.

ACTUAL CONSTITUENTS.

| | Cubic feet. | Cubic feet. | |
|---|---|---|---|
| Hydro-carbons and olefiant gas | 159·7 | = 202·8 | olefiant gas. |
| Light carburetted hydrogen .. | 380·8 | | |
| Hydrogen .. .. .. | 68·8 | | |
| Carbonic oxide .. .. .. | 42·9 | | |
| Aqueous vapour .. .. .. | 9·8 | | |
| | 662·0 | | |

#### 2. WITH WATER GAS.

Cannel used .. .. .. .. 112 lbs.
Gas produced .. .. .. .. 1908 cubic feet.
Coke left .. .. .. .. 37½ lbs.
Time occupied .. .. .. .. 3 hours.

ILLUMINATING POWER OF GAS.

| Shadow Test. | 2 ft. per hr. | 3 ft. per hr. | 4 ft. per hr. | 5 ft. per hr. | 8 ft. per hr. |
|---|---|---|---|---|---|
| 7·425 cubic feet per hour. = 1 candle. | Fish-tail No. 1. Press. ·3 in. = 11·2 candles. | Fish-tail No. 2. Pressure— = 10·6 candles. | Fish-tail No. 4. Press. ·4 in. — 20·0 candles. | Fish-tail No. 4. Press. ·6 in. — 20·7 candles. | Winfield's Burner = 50·6 candles. |

Illuminating power of total gas, when burnt at the rate of 3 feet per hour = 1068·4 sperm candles.

PER CENTAGE COMPOSITION OF GAS.

| | | |
|---|---|---|
| Hydro-carbons and olefiant gas | 14·12 | = 19·84 olefiant gas. |
| Light carburetted hydrogen .. | 22·25 | |
| Hydrogen .. .. .. | 45·51 | |
| Carbonic oxide .. .. .. | 14·34 | |
| Carbonic acid .. .. | 3·78 | |
| | 100·00 | |

Amount of carbonic acid generated by one volume of condensible hydro-carbons = 2·81 volumes.

ACTUAL CONSTITUENTS.

| | Cubic feet. | Cubic feet. | |
|---|---|---|---|
| Hydro-carbon and olefiant gas .. | 265·5 | = 373 | olefiant gas. |
| Light carburretted hydrogen .. | 418·2 | | |
| Hydrogen .. .. .. .. | 855·5 | | |
| Carbonic oxide .. .. .. | 269·6 | | |
| Carbonic acid .. .. .. | 71·0 | | |
| Aqueous vapour .. .. .. | 28·2 | | |
| | 1908·0 | | |

Hence:—

| | Per Cwt. | Per Ton. | Per Cent. |
|---|---|---|---|
| Gain in illuminating power by the employment of water gas .. .. | 501·4 candles | 10,028 candles | 88·4 |
| Gain in olefiant gas .. | 170·2 c. feet | 3,404 c. feet | 83·9 |
| Gain in quantity of gas .. | 124·6 „ | 24,920 „ | 188·2 |

In this experiment it was found impossible to generate more than one half of the requisite quantity of water gas from the water retort connected with that in which the cannel was distilled, and consequently another water retort had to be employed; but this, instead of pouring its gas into the coal retort, delivered it directly into the hydraulic main, thus reducing the advantageous operation of the water gas in rapidly sweeping out the illuminating gases from the coal retort, and, in addition, preventing the removal of a considerable amount of carbonic acid, which materially diminished the illuminating power as indicated by the photometer.

* The fish-tail burners used in these experiments were very small, and made expressly for this exceedingly rich gas.

I have since had the opportunity of repeating the experiment with a new apparatus, consisting of one coal and two water retorts, both of the latter delivering their gas into the lower division of the former; the other conditions of the experiment were the same as before.

SECOND EXPERIMENT.

| | |
|---|---|
| Cannel used .. .. .. | 112 lbs. |
| Gas produced .. .. .. | 2586 cubic feet. |
| Time occupied .. .. .. | 3h. 15m. |

ILLUMINATING POWER OF GAS.

| 2 feet per hour. | 3 feet per hour. | 4 feet per hour. | 5 feet per hour. | 5 feet per hour. |
|---|---|---|---|---|
| Fish-tail, No. 1. 6 candles. | Fish-tail, No. 1. 10·1 candles. | Fish-tail, No. 4. 15·1 candles. | Fish-tail, No. 4. 17·9 candles. | Leslie's Burner. 20·0 candles. |

Total gas produced, when burnt at the rate of 5 feet per hour, yields light .. = 1034·4 sperm candles.

| | Per Cwt. | Per Ton. | Per Cent. |
|---|---|---|---|
| Hence gain in illuminating power, by application of water gas .. .. .. | 467·4 candles. | 9348 candles. | 82·4 |
| Gain in quantity of gas .. | 1924 cub. ft. | 38,480 cub. ft. | 290·6 cub. ft. |

No analyses were made in connection with this experiment, but it was carefully ascertained that the gas did not contain more than a mere trace of carbonic acid.

The experiment thus demonstrates the fact, that the whole of the carbonic acid is removed from the water gas during its passage through the coal retort, even when Boghead cannel is employed; and also, that the enormous quantity of 51,720 cubic feet of gas, possessing a high illuminating power, is capable of being produced from one ton of the Boghead cannel; but it does not show, as might have been expected, that the additional quantity of water gas passed through the coal retort has had the effect of preserving more of the illuminating hydro-carbons than in the previous experiment; on the contrary, a slight diminution of total illuminating power is seen on comparing the results of the two experiments, but this diminution is accounted for when we consider that the first trial was made in summer, whilst the last was performed during the late frost and with the holder covered with snow; the gas, therefore, passed through a species of ice-test, and suffered a small diminution of illuminating power, the extent of which we shall presently refer to.

LESMAHAGO CANNEL.

1. WITHOUT WATER GAS.

| | |
|---|---|
| Cannel used .. .. .. | 112 lbs. |
| Gas produced .. .. .. | 531 cubic feet. |
| Coke left .. .. .. | 54½ lbs. |
| Time occupied .. .. .. | 3h. 20m. |

ILLUMINATING POWER OF GAS.

| Shadow Test. | 2 feet per hour. | 3 feet per hour. | 4 feet per hour. | 4½ feet per hour. |
|---|---|---|---|---|
| ·35 cubic ft. per hour = 1 candle. | Fish-tail, No. 1. Pressure ·6 in. = 19·1 candles. | Fish-tail, No. 1. Pressure ·6 in. = 23·2 candles. | Fish-tail, No. 3. Pressure ·5 in. = 28·7 candles. | Fish-tail, No. 3. Pressure 6 in. = 35 candles. |

Total quantity of gas, when burnt at the rate of 4 feet per hour, yields light .. = 381 sperm candles.

PER CENTAGE COMPOSITION OF GAS.

| | |
|---|---|
| Hydro-carbons and olefiant gas .. | 16·31 = 28·30 olefiant gas. |
| Light carburetted hydrogen .. | 42·01 |
| Hydrogen .. .. .. .. | 26·84 |
| Carbonic oxide .. .. .. | 14·18 |
| Carbonic acid .. .. .. | ·66 |
| Oxygen, Nitrogen } traces. | |
| | 100·00 |

ACTUAL CONSTITUENTS.

| | Cubic feet. | Cubic feet. |
|---|---|---|
| Hydro-carbons and olefiant gas .. | 85·3 | = 148 olefiant gas. |
| Light carburetted hydrogen .. | 219·8 | |
| Hydrogen .. .. .. | 140·5 | |
| Carbonic oxide .. .. .. | 74·2 | |
| Carbonic acid .. .. .. | 3·4 | |
| Aqueous vapour .. .. .. | 7·8 | |
| | 531·0 | |

Amount of carbonic acid produced by one volume of condensible hydro-carbons = 3·47 volumes.

2. WITH WATER GAS.

| | |
|---|---|
| Cannel used .. .. .. | 112 lbs. |
| Gas produced .. .. .. | 1459 cubic feet. |
| Coke left .. .. .. | 49 lbs. |
| Time occupied .. .. .. | 3h. 18m. |

ILLUMINATING POWER OF GAS.

| Shadow Test. | 2 feet per hour. | 3 feet per hour. | 4 feet per hour. | 5 feet per hour. |
|---|---|---|---|---|
| ·5 cubic feet per hour = 1 candle. | Fish-tail, No. 2. Pressure ·5 in. = 9·3 candles. | Fish-tail, No. 2. Pressure ·6 in. = 13·2 candles. | Fish-tail, No. 2. Pressure ·6 in. = 19·1 candles. | Fish-tail, No. 4. Pressure ·5 in. = 28·7 candles. |

Total quantity of gas, when burnt at the rate of 4 feet per hour, yields light = 696·7 sperm candles.

PER CENTAGE COMPOSITION OF GAS.

| | |
|---|---|
| Hydro-carbons and olefiant gas | 10·89 = 19·05 olefiant gas. |
| Light carburetted hydrogen .. | 18·94 |
| Hydrogen .. .. .. | 55·09 |
| Carbonic oxide .. .. | 15·02 |
| Carbonic acid .. .. .. | ·06 |
| | 100·00 |

ACTUAL CONSTITUENTS.

| | Cubic feet. | Cubic feet. |
|---|---|---|
| Hydro-carbons and olefiant gas | 156·5 | = 273·9 olefiant gas. |
| Light carburetted hydrogen .. | 272·3 | |
| Hydrogen .. .. .. | 791·9 | |
| Carbonic oxide .. .. | 215·9 | |
| Carbonic acid .. .. .. | ·9 | |
| Aqueous vapour .. .. | 21·5 | |
| | 1459·0 | |

Amount of carbonic acid generated by one volume of condensible hydro-carbons = 3·50 volumes.

| | Per Cwt. | Per Ton. | Per Cent. |
|---|---|---|---|
| Gain in illuminating power by application of water gas .. .. .. | 315·7 candles. | 6314 candles. | 82·8 |
| Gain in quantity of olefiant gas .. .. .. | 125·9 cub. ft. | 2518 cub. ft. | 85.1 |
| Gain in total quantity of gas produced .. .. | 928 „ | 18,560 „ | 174·8 |

METHYL CANNEL.

1. WITHOUT WATER GAS.

| | |
|---|---|
| Cannel used .. .. .. | 112 lbs. |
| Gas produced .. .. .. | 478 cubic feet. |
| Coke left .. .. .. | 51 lbs. |
| Time occupied .. .. .. | 3 hours. |

ILLUMINATING POWER OF GAS.

| 1 foot per hour. | 2 feet per hour. | 3 feet per hour. | 4 feet per hour. | 5 feet per hour. |
|---|---|---|---|---|
| Fish-tail, No. 1 = 3·7 candles. | Fish-tail, No. 1. = 10·1 candles. | Fish-tail, No. 1. = 17·4 candles. | Fish-tail, No. 2. = 21·5 candles. | Fish-tail, No. 3. = 27·8 candles. |

Illuminating power of total gas, when burnt at the rate of 5 feet per hour = 265·8 candles.

PER CENTAGE COMPOSITION OF GAS.

| | |
|---|---|
| Hydro-carbons and olefiant gas | 14·48 = 18·53 olefiant gas. |
| Light carburetted hydrogen .. | 38·75 |
| Hydrogen .. .. .. | 33·32 |
| Carbonic oxide .. .. | 13·40 |
| Carbonic acid .. .. .. | ·05 |
| Nitrogen, Oxygen } traces | |
| | 100·00 |

Amount of carbonic acid generated by one volume of condensible hydre-carbons = 2·56 volumes.

ACTUAL CONSTITUENTS.

| | Cubic feet. | Cubic feet. |
|---|---|---|
| Hydro-carbons and olefiant gas | 68·2 | = 87·3 olefiant gas. |
| Light carburetted hydrogen .. | 182·5 | |
| Hydrogen .. .. .. | 156·9 | |
| Carbonic oxide .. .. | 63·1 | |
| Carbonic acid .. .. .. | ·3 | |
| Aqueous vapour .. .. | 7·0 | |
| | 478·0 | |

2. WITH WATER GAS.

| | |
|---|---|
| Cannel used .. .. .. | 112 lbs. |
| Gas produced .. .. .. | 1320 cubic feet. |
| Coke left .. .. .. | 51 lbs. |
| Time .. .. .. .. | 3 hours. |

ILLUMINATING POWER OF GAS.

| 2 feet per hour. | 3 feet per hour. | 4 feet per hour. | 5 feet per hour. |
|---|---|---|---|
| Fish-tail, No. 1. = 7·2 candles. | Fish-tail, No. 2. = 10·7 candles. | Fish-tail, No. 2. = 15·3 candles. | Fish-tail, No. 4. = 21 candles. |

Illuminating power of total quantity of gas, burnt at rate of 5 feet per hour = 554·4 candles.

PER CENTAGE COMPOSITION OF GAS.

| | |
|---|---|
| Hydro-carbons and olefiant gas | 11·06 = 14·04 olefiant gas. |
| Light carburetted hydrogen .. | 22·89 |
| Hydrogen .. .. .. | 45·58 |
| Carbonic oxide .. .. | 20·44 |
| Carbonic acid .. .. .. | ·03 |
| Nitrogen, Oxygen } traces | |
| | 100·00 |

Amount of carbonic acid generated by one volume of condensible hydro-carbons = 2·54 volumes.

ACTUAL CONSTITUENTS.

| | Cubic feet. | Cubic feet. |
|---|---|---|
| Hydro-carbons and olefiant gas | 143·8 | =182·6 olefiant gas. |
| Light carburetted hydrogen .. | 297·8 | |
| Hydrogen .. .. .. | 592·7 | |
| Carbonic oxide .. .. .. | 265·8 | |
| Carbonic acid .. .. .. | ·4 | |
| Aqueous vapour.. .. .. | 19·5 | |
| | 1320·0 | |

| | Per Cwt. | Per Ton. | Per Cent. |
|---|---|---|---|
| Gain in illuminating power by application of water gas .. .. .. | 288·6 candles. | 5772 candles. | 108·6 |
| Gain in quantity of olefiant gas .. .. .. | 95·3 cubic ft. | 1906 cubic ft. | 109·2 |
| Gain in quantity of gas.. | 842 „ | 16,840 „ | 176·2 |

NEWCASTLE CANNEL (RAMSAY'S).

1. WITHOUT WATER GAS.

| | |
|---|---|
| Cannel used .. .. .. .. | 112 lbs. |
| Gas produced .. .. .. .. | 515 cubic feet. |
| Coke left .. .. .. .. | 74½ lbs. |
| Time occupied.. .. .. .. | 3h. 20m. |

ILLUMINATING POWER OF GAS.

| Shadow Test. | 2 feet per hour. | 3 feet per hour. | 4 feet per hour. | 5 feet per hour. |
|---|---|---|---|---|
| ·575 cubic feet per hour. = 1 candle. | Fish-tail, No. 1. Pressure ·4 in. = 8·4 candles. | Fish-tail, No. 1. Pressure ·5 in. = 11·9 candles. | Fish-tail, No. 1. Pressure ·8 in. = 20·0 candles. | Fish-tail, No. 2. Pressure ·8 in = 24·5 candles. |

Illuminating power of total gas, when burnt at rate of 5 feet per hour = 252·3 sperm candles.

PER CENTAGE COMPOSITION OF GAS.

| | | |
|---|---|---|
| Hydro-carbons and olefiant gas | 9·68 | =16·94 olefiant gas. |
| Light carburetted hydrogen .. | 41·38 | |
| Hydrogen .. .. .. | 33·30 | |
| Carbonic oxide .. .. .. | 15·64 | |
| Carbonic acid .. .. .. | 0·00 | |
| | 100·00 | |

Amount of carbonic acid generated by one volume of condensible hydro-carbons = 3·50 volumes.

ACTUAL CONSTITUENTS.

| | Cubic feet. | Cubic feet. |
|---|---|---|
| Hydro-carbons and olefiant gas.. | 49·1 | =85·9 olefiant gas. |
| Light carburetted hydrogen .. | 210·0 | |
| Hydrogen.. .. .. .. | 168·9 | |
| Carbonic oxide .. .. .. | 79·4 | |
| Aqueous vapour .. .. .. | 7·6 | |
| | 515·0 | |

2. WITH WATER GAS.

| | |
|---|---|
| Cannel ussd .. .. .. .. | 112 lbs. |
| Gas produced .. .. .. | 751 cubic feet. |
| Coke left .. .. .. .. | 74 lbs. |
| Time occupied .. .. .. | 3h. 25m. |

ILLUMINATING POWER OF GAS.

| Shadow Test | 2 ft. per hour. | 3 ft. per hour. | 4 ft. per hour. | 5 ft. per hour. | 6 ft. per hour. |
|---|---|---|---|---|---|
| ·725 cubic ft. per hour =1 candle. | Fish-tail No.2 Press. ·4i n. =5·8 candls. | Fish-tail No.2 Press. ·6in. =10·3 candls. | Fish-tail No.2 Press. ·6in. =14·1 candls. | Fish-tail No.4 Press. ·8 in. =18·8 candls. | Fish-tail No.4 Press. ·7 in. =23·2 candls. |

Illuminating power of total gas, when burnt at rate of 5 feet per hour = 282·3 sperm candles.

PER CENTAGE COMPOSITION OF GAS.

| | | |
|---|---|---|
| Hydro-carbons and olefiant gas | 9·04 | = 13·15 olefiant gas. |
| Light carburetted hydrogen .. | 26·84 | |
| Hydrogen .. .. .. | 44·26 | |
| Carbonic oxide .. .. | 19·39 | |
| Carbonic acid .. .. .. | ·47 | |
| | 100·00 | |

Amount of carbonic acid generated by one volume of condensible hydro-carbons = 2·91 volumes.

ACTUAL CONSTITUENTS.

| | Cubic feet. | Cubic feet. |
|---|---|---|
| Hydro-carbons and olefiant gas | 66·9 | = 97·3 olefiant gas. |
| Light carburetted hydrogen .. | 198·6 | |
| Hydrogen .. .. .. | 327·5 | |
| Carbonic oxide .. .. | 143·5 | |
| Carbonic acid .. .. .. | 3·4 | |
| Aqueous vapour .. .. | 11·1 | |
| | 751·0 | |

Hence—

| | Per Cwt. | Per Ton. | Per Cent. |
|---|---|---|---|
| Gain in illuminating power by the employment of water gas | =30 candles. | 600 candles. | 11·2 |
| Gain in quantity of olefiant gas.. | 11·4 cubic ft. | 228 cubic ft. | 11·3 |
| Gain in total quantity of gas.. | 236 „ | 4720 „ | 45·8 |

The results yielded by this cannel are very different from those obtained with the same material at the Western Gas Works, London. Mr. Wright, the eminent engineer to the Western Company, has lately made a series of experiments, conducted with great care and accuracy, upon the gas there produced, and states that a flame, consuming three feet per hour, produces light equal to from 16·6 to 20 candles, and this statement is perfectly corroborated by my own analysis of a specimen of the Western Company's gas, collected June 15, 1851. As I have not had an opportunity of repeating the practical examination, I can only reconcile these discordant results by supposing either that the specimen of Newcastle cannel sent me for investigation was of inferior quality, or that some unknown disturbing cause interfered with my experiments upon it. I should anticipate that at least 29,000 cubic feet of gas per ton, with an illuminating power equal to 20 candles, for a consumption of five feet per hour, could be obtained from this cannel, by the application of water gas, if of the same quality as that used at the Western Gas Company's works, Paddington.

WIGAN CANNEL (BALCARRES).

1. WITHOUT WATER GAS.

| | |
|---|---|
| Cannel used.. .. .. .. .. | 112lbs. |
| Gas produced .. .. .. .. | 522 cubic feet. |
| Coke left .. .. .. .. | 68½lbs. |
| Time occupied .. .. .. .. | 3h. 25m. |

ILLUMINATING POWER OF GAS.

| Shadow Test | 2 feet per hour. | 3 feet per hour. | 4 feet per hour. | 5 feet per hour. |
|---|---|---|---|---|
| ·675 cubic feet per hour. = 1 candle. | Fish-tail, No. 2. Pressure ·4 in. = 6·0 candles. | Fish-tail, No. 2. Pressure ·5 in. =10·9 candles. | Fish-tail, No. 2. Pressure ·6 in. =14·7 candles. | Fish-tail, No. 4. Pressure ·6 in. =19·9 candles. |

Illuminating power of total gas, when burnt at rate of 5 feet per hour = 207·8 candles.

No analysis of this and the following specimen of gas was made.

2. WITH WATER GAS.

| | |
|---|---|
| Cannel used .. .. .. .. | 112lbs. |
| Gas produced .. .. .. .. | 775 cubic feet. |
| Coke left .. .. .. .. | 67¾lbs. |
| Time occupied .. .. .. .. | 3h. 15m. |

ILLUMINATING POWER OF GAS.

| Shadow Test. | 2 feet per hour. | 3 feet per hour. | 4 feet per hour. | 5 feet per hour. |
|---|---|---|---|---|
| ·7 cubic feet per hour. = 1 candle. | Fish-tail, No. 2. Pressure .4 in. = 5·6 candles. | Fish-tail, No. 3. Pressure ·4 in. = 9 5 candles. | Fish-tail, No. 3. Pressure ·5 in. =14·1 candles. | Fish-tail, No. 4 Pressure ·6 in. =19·1 candles. |

Illuminating power of total gas when burnt at rate of 5 feet per hour = 296 candles.

Hence—

| | Per Cwt. | Per Ton. | Per Cent. |
|---|---|---|---|
| Gain in illuminating power by the employment of water gas .. .. .. | = 88·2 candles. | 1764 candles. | 42·4 |
| Gain in total quantity of gas.. | „ 253 cubic ft. | 5060 cubic ft. | 48·5 |

NEWCASTLE COAL (PELTON).

I have not ascertained the results which this coal yields with water gas, owing to an experiment which I made being rendered useless by the occurrence of a leakage in the apparatus, the sample of coal at my disposal being so nearly exhausted as not to leave a sufficient quantity for a repetition of the trial. The following examination of the gas produced from the coal distilled without water gas may not, however, prove entirely uninteresting:—

WITHOUT WATER GAS.

| | |
|---|---|
| Coal used .. .. .. .. | 112lbs. |
| Gas produced .. .. .. | 504 cubic feet. |
| Coke left .. .. .. .. | 70lbs. |

ILLUMINATING POWER OF GAS.

| 2 feet per hour. | 3 feet per hour. | 4 feet per hour. | 5 feet per hour. | 6 feet per hour. |
|---|---|---|---|---|
| Fish-tail, No.1 Pressure ·6 in. = 4·6 candles. | Fish-tail, No. 2. Pressure ·6 in. = 8·8 candles. | Fish-tail, No. 3. Pressure ·4 in. =12·15 candles. | Fish-tail, No. 4. Pressure ·4 in. = 19·9 candles. | Fish-tail, No. 4. Pressure ·6 in. = 17·0 candles. |

Illuminating power of total gas, when burnt at rate of 5 feet per hour = 150·2 candles.

PER CENTAGE COMPOSITION OF GAS.

| | | |
|---|---|---|
| Hydro-carbons and olefiant gas .. | 3·87 | = 7·16 olefiant gas. |
| Light carburetted hydrogen .. | 32·87 | |
| Hydrogen .. .. .. .. | 50·05 | |
| Carbonic oxide .. .. .. | 12·89 | |
| Carbonic acid .. .. .. | ·32 | |
| Nitrogen and oxygen .. traces .. | „ | |
| | 100·00 | |

Amount of carbonic acid generated by one volume of condensible hydro-carbons = 3·70 volumes.

ACTUAL CONSTITUENTS.

| | Cubic feet. | Cubic feet. |
|---|---|---|
| Hydro-carbons and olefiant gas .. | 19·2 = | 35·5 olefiant gas. |
| Light carburetted hydrogen .. | 163·2 | |
| Hydrogen .. .. .. .. | 248·5 | |
| Carbonic oxide .. .. .. | 64·0 | |
| Carbonic acid .. .. .. | 1·6 | |
| Aqueous vapour .. .. .. | 7·5 | |
| | 504·0 | |

The foregoing experiments give us a much more complete insight into the so-called hydro-carbon process of gasmaking than did those previously made on resin gas, and they also bring to light several circumstances highly favourable to this process, whi h could scarcely have been predicted previous to the actual trials being made. The first and most important of these is the disappearance of the carbonic acid contained in the water gas during its passage through the coal retort; this disappearance is so complete, that the resulting gaseous mixture actually contains a much smaller per centage than does the gas obtained by the distillation of the coal alone. It is true that the gases examined in the above experiments had streamed through small wet and dry lime purifyers; but I have shown that, in the production of hydro-carbon gas from resin, lime was almost useless for removing carbonic acid in these purifyers, and that, even when charged with caustic soda, they still left 3 59 per cent. in the gas. It is therefore certain, that the carbonic acid of the water gas is destroyed by some action taking place during its passage through the coal retort, thus obviating all trouble and expense of removing this gas by any purifying process whatever. There is little doubt that this removal of the carbonic acid depends upon its conversion into carbonic oxide gas by the carbonaceous matters in the coal retort; and of these the coke is probably the most active, since the volatile matters do not differ materially from those produced during the distillation of resin; and these, we have seen, fail to remove the acid gas.

Another favourable circumstance occurring in the process consists in the relatively small quantity of carbonic oxide that is produced. A large proportion of this gas would be equally objectionable with a high per centage of light carburetted hydrogen, on account of the quantity of carbonic acid formed during its subsequent combustion. A reference to the composition of the foregoing gases shows us, however, that in all cases the amount of carbonic acid generated is less than that formed by the combustion of an equal volume of the gas obtained from the same coals by the ordinary process of manufacture, and in some cases it is even less than that produced by a pure coal gas flame giving an equal light. The following table shows this comparison:—

| Name of Gas. | Cubic Feet of Carbonic Acid produced by Combustion of 100 cubic feet of Gas. | Cubic Feet of Carbonic Acid produced per hour by a Light equal to 20 Candles. |
|---|---|---|
| Ince-hall cannel .. .. .. | 83·5 | 3·76 |
| Ditto with water gas | 69·5 | 3·47 |
| Methyl cannel .. .. .. | 89·3 | 3·32 |
| Ditto with water gas | 71·5 | 3·40 |
| Ramsay's Newcastle cannel .. | 90·9 | 3·64 |
| Ditto with water gas | 72·8 | 3·86 |
| Lesmahago cannel .. .. | 113·9 | 2·95 |
| Ditto with water gas | 72·1 | 3·02 |
| Boghead cannel .. .. .. | 127·2 | 2·96 |
| Ditto with water gas | 76·3 | 3·05 |

The favourable position which the hydrocarbon gases occupy in the above comparison could not have been attained if the whole or even a very large portion of the water gas had been generated in the charcoal retort; for, when water gas alone is generated, it is found to consist of hydrogen and carbonic oxide, mixed with quantities of carbonic acid, varying from 0 to 15 per cent., according to the heat employed and other circumstances; when the per centage of the acid gas is 0, then the volumes of hydrogen and carbonic oxide are equal; and, as no important quantity of carbonic acid was ultimately present in the gases produced in the foregoing experiments, the whole of that gas entering the coal retort must be converted into carbonic oxide, and therefore we may consider the water gas entering the coal retort as being composed of equal volumes of hydrogen and carbonic oxide. Now, if the increase in the total quantity of gas produced by the application of the hydrocarbon process to any given coal or cannel were due only to the water gas formed in the charcoal retort, it is obvious that the gain in carbonic oxide ought to be equal to the gain in hydrogen; but a glance at the analytical results shows that this is far from being the case. Thus, with

BOGHEAD CANNEL.

The gain in hydrogen .. =786·9 cubic feet
And „ carbonic oxide=226·7 „
Hence—Gain in hydrogen : gain in carbonic oxide= ·5 : 1.

With

LESMAHAGO CANNEL.

The gain in hydrogen .. =651·2 cubic feet
And „ carbonic oxide=141·6 „
Hence—Gain in hydrogen : gain in carbonic oxide=4·6 : 1.

With

INCE-HALL CANNEL.

The gain in hydrogen .. =183·0 cubic feet
And „ carbonic oxide= 63·9 „
Hence—Gain in hydrogen : gain in carbonic oxide=2·9 : 1.

With

RAMSAY'S NEWCASTLE CANNEL.

The gain in hydrogen .. =158·7 cubic feet
And „ carbonic oxide= 64·2 „
Hence—Gain in hydrogen : gain in carbonic oxide=2·5 : 1.

And with

METHYL CANNEL.

The gain in hydrogen .. =435·6 cubic feet
And „ carbonic oxide=202·6 „
Hence—Gain in hydrogen : gain in carbonic oxide=2·2 : 1.

It is, therefore, evident that a large quantity of water gas must be generated by the action of steam upon the carbonaceous materials in the coal retort, and that this water gas contains a very much greater per centage of hydrogen than that produced in the charcoal retort. Although we are not yet sufficiently acquainted with the action of watery vapour upon organic substances at high temperatures to state positively the cause of this excess of hydrogen, yet there can be little doubt that it is derived from the action of steam upon the hydro-carbons of the tar; for as watery vapour, in acting upon carbon, transfers its oxygen to that element, forming carbonic oxide and an equal volume of hydrogen, so also, when steam acts upon a compound of carbon and hydrogen, it produces carbonic oxide, but in doing so sets at liberty not only its own hydrogen, but that of the carbo-hydrogen also; and thus the volumes of hydrogen and carbonic oxide remain no longer equal, but the volume of the former becomes double, treble, or even fourfold that of the latter.

(*To be continued.*)

## Correspondence.

### WHITE'S HYDRO-CARBON GAS.

Sir,—As "coming events cast their shadows before," I send you the following dim and shadowy extract from the pages of the *Perth Courier* meant, no doubt, by way of herald to the phosphoric wonders now about to eclipse the sun at Dunkeld. If I may judge of the solidity of the scheme by the density of its shadow, the "water gas" must be a very substantial affair; for I confess my utter inability to see through the subjoined quotation, although an experimental essay has convinced me that I can see "through a millstone" quite as well as the generality of people, by applying my eye at the central aperture. Hence, I will suggest that the motto, "lucus a non lucendo," shall not be restricted to the water gas itself, but possess a wider application. Now, however, for our extract:—"Dunkeld Gas Works.—We formerly mentioned that a contract had been entered into for lighting this town with water gas. The preparations have now been completed, and on Tuesday last a preliminary trial was made in presence of Mr. White, of Manchester, the patentee; Dr. Miller, of Manchester; and others interested. The result could not afford a correct test of its merits; the atmospheric air had not been entirely excluded from the gasometer, nor had the alleyne (allyle?), from which the carbon is extracted *come forward*, and in *its* place cannel coal had to be used; still the trial was satisfactory as far as *it* went. There was neither smell nor smoke emitted from *it*, either during *its* combustion or manufacture—two very important recommendations. The comparative cheapness of the gas is also an important element in the question (what question?), and the more so in a town of limited extent and trade as this." Now, sir, whether this was written whilst the allyle would not come forward, or whether the whole is merely inserted by the editor as a Christmas conundrum, I cannot say; but, presuming the latter hypothesis to be correct, will any one oblige me with a meaning to the word "*it*," as it stands recorded in the above composition. "It" forms the key of the whole mystery. Thus—the result could not afford a correct test of "its" merits; "its" place was vicariously substituted by cannel coal, from whence "it" seems to be allyle; but then the trial was satisfactory as far as "it" went, and the allyle would not go at all. There was neither smell nor smoke emitted from "it" either during "its" combustion or manufacture, two very important recommendations, so that the combustion and manufacture of "it" form two very important recommendations. But the concluding sentence is of public interest. "The comparative cheapness of the gas is also a very important element in the question, and the more so in a town of limited extent and trade;" so that, the smaller the town, the greater the advantage of water gas. A celebrated tragic hero once exclaimed, "My wound is great because it is so small;" and it appears that the advantages of water gas increase in the inverse ratio of its consumption. Well, wonders will never cease; but this paradoxical conclusion is supported by facts. Thus, the small

town of Warminster, having lately benefitted by a minimum supply of light, has resolved to secure a maximum of advantage by using no water gas whatever. Similarly, too, the good folks of Southport seem intent upon making a fortune, as the following extract from the leading article of the *Southport Visiter*, of December 27, indicates:—

"It is beyond dispute that the gas now supplied to the consumers of the article in this town has been deficient for some weeks in the principal and most desirable quality—illuminating power. It is very annoying to us, who procured the introduction of the hydro-carbon gas into Southport, and paved its way for further and enviable popularity, to hear this pet article of domestic economy become a by-word and a subject for warm discussion at our commissioners' meetings. As we have said, there has been much reason for finding fault with one quality of the gas, and we are glad that the gas committee have taken the subject into serious consideration."

Dunkeld is not, therefore, the only place where the allyle exhibits its *mauvaise honte*, and refuses to come forward. The idea of supplying its place by cannel coal is, however, a lucky hit, though somewhat calculated to revive the story of the flint soup.

*London, January*, 8, 1852. TIMOTHY TICKLE.

## Miscellaneous News.

### GREAT CENTRAL GAS CONSUMERS' COMPANY.

COURT OF COMMON COUNCIL, DEC. 18, 1851.

A court was held this day for the despatch of business.

Several gentlemen rose, each claiming to be in order in bringing on motions which were respectively placed against their names in the paper of business. A somewhat noisy conflict of opinions and assertions ensued, which was eventually put an end to by

The LORD MAYOR declaring Mr. Dakin's motion to take precedence, on the important subject of the appointment of certain officers in the Great Central Gas Consumers' Company.

The following is the motion of which Mr. Dakin had given notice:—

"That this court do, in the month of December, and in the month of December yearly, appoint one or more fit person or persons to examine and audit the accounts of the Great Central Gas Consumers' Company for the preceding year, in pursuance of the 15th section of the act of Parliament 14 and 15 Vic., cap. 49, entitled, 'An Act to Incorporate the Great Central Gas Consumers' Company.'

"That this court do also appoint a practical chemist, or other competent person, to test the quality of the gas supplied by the company, agreeably to the 29th section of the said act.

"That this court do also appoint a fit person to be inspector, to test, as between the company and the consumer, all meters furnished or supplied by the company, and to stamp the same agreeably to the 40th section of the said act."

Mr. DAKIN: My Lord Mayor, it might be thought that I was asking for some privilege and favour, instead of asking this court to place upon us some restrictions, which we, when we are asking favour at the hands of the corporation, desire to be put. (Hear, hear.) The Great Central Gas Consumers' Company ask this court to appoint an auditor of accounts, practical chemists to test the quality of their gas, and inspectors of meters. (Hear, hear.) When this question came before the court originally upon the desirableness of having a new company introduced, it was said that they would give certain advantages. To that remark it was replied, that the advantages proposed would be merely a mockery, a delusion, and a snare, unless the question of price was bound up with that of proper quality and measurement, and it was argued that any future reduction, without an auditorship, would not be effected. We were then asked by the Court of Sewers to put certain clauses into an agreement with them, binding ourselves to insert in the bill before Parliament those clauses, giving this court the power of making the appointments to which I have adverted. This motion can be of no earthly advantage to me, or to those with whom I am connected. (Hear, hear.) As chairman of the company, I might reasonably wish that this subject might be passed over, but I do now what I should have done had I been wholly disconnected with the company, namely, I move that this court, having had granted to them privileges, should now enforce them. It is for this court and the citizens of London to settle this question. I wish for an answer, aye or no. If they will not make the appointments, I, on the part of the company whom I represent, will take care that the business is carried out in a fair and proper manner. If, on the other hand, they will make the appointments, we will give those whom they select every facility in our power for the purpose of carrying out the intended object. (Cheers.)

Mr. Deputy HOLT seconded the motion. He was glad to find that the chairman of the Great Central Gas Consumers' Company kept faith with the court, and trusted that the appointment of competent persons would raise the character of the company higher, if possible, in the estimation, not only of the court, but of the public generally. (Hear, hear.)

Mr. H. L. TAYLOR: My Lord Mayor, I am sorry there has been some little feeling shown to-day in reference to the order in which this motion stood upon the paper; and I will take this opportunity of stating that never was any motion so much out of order or out of place as that which we are now considering. (Cries of "Order! order!")

Mr. DAKIN: I submit that the hon. gentleman is out of order in impeaching the judgment of the chair, which is most disorderly. (Hear, hear.)

Mr. H. L. TAYLOR: I repeat what I said, and for this reason, that when Mr. Dakin took up the question at the last court, he did so when it was not in its rotation in the paper of business. (Cries of "No" and "Yes.") I shall ask the court not to pass the motion which is now brought forward; and it is my intention before I sit down, to move a substantive amendment to it. In the first place, the worthy and estimable chairman of the company, whose merits nobody values more highly than I do, has stated that he is asking no favour from the court. (Hear, hear.) I do not agree with him in that assertion. He is not only asking a very great, but one of the greatest, favours that could be asked by, or conferred upon, any company. He is asking that this corporation should identify itself with the Great Central Gas Consumers' Company. (Hear, hear.) I apprehend that it is not unlikely that that company may stand in need of such support. In my judgment they would have acted much more indpendently if they had not come to this court for support, and to seek for a character. It is all very well for the chairman of the company to tell you that they are about to pay the persons appointed for the services rendered by them. Does the act of Parliament state as much?

Mr. DAKIN: It does. (Hear, hear.)

Mr. H. L. TAYLOR: I deny it, and here is the act of Parliament, and you will be able to judge for yourselves. Let Mr. Dakin point out, if he can, who is to pay the practical chemist. Does the clause in the act contain anything that will render it imperative upon the company to pay that functionary?

Mr. DAKIN: Yes.

Mr. H. L. TAYLOR: There is an intention on the part of the company to entrap the court. (Oh, oh!) I have no doubt that the gentlemen who cry "Oh!" so strenuously hold shares in the company—(Laughter)—and I trust that they will have the good sense to walk out of court and abstain from voting. If they will do so, I have no doubt the court, will then agree to my amendment. (No, no.) You are going to pay the auditor an enormous sum, namely, three guineas a day, and yet no number of hours is fixed during which he is to labour. The time ought to be defined; otherwise the individual selected may be at the beck and call of the company from six in the morning till twelve at night. I very much doubt whether any respectable man can be found to accept this office under such circumstances. Inspectors are to be appointed, who are to be chosen by the commissioners of sewers and the company. I need not tell the court that the Great Central Gas Consumers' Company have done almost as they felt inclined with the commissioners of sewers. They have had permission to do that which no other company that ever was established had permission to do. The commissioners of sewers and the company are to appoint those inspectors, and nothing is defined as to the rate of payment; but it is simply stated that they are to agree to some rate of remuneration, which, of course, they are sure to do. Mr. Recorder is to settle it. The result of all this will be, that the inspectors will absolutely be the parties whom the company shall select; and they will be palmed off upon the gas consumers in the City as being the inspectors whom the corporation appoint. They are, therefore, to be identified with the corporation in every act they perform, whether good, bad, or indifferent. I wish this gas company would adopt the course pursued by all other companies—namely, audit their own accounts. Let them appoint some indifferent and independent person to audit their accounts. I am confident the public will be satisfied if the name of a respectable person as auditor is attached to the accounts. Now that the company has established itself, let it go on in the same way as any private mercantile firm, but do not let the corporation interfere with it in any way whatever. (Hear, hear.) The act of Parliament, amongst other things, says, the corporation may appoint auditors "if they think fit;" so that you are not absolutely compelled to appoint officers of this description. I now move the following amendment:—

"That, inasmuch as the Great Central Gas Consumers' Company's act does not render imperative, but grants merely a permissive right to the corporation to appoint an auditor, a practical chemist, and an inspector, while it leaves the salary of the latter undefined, and that of the chemist entirely unprovided for; and as there is also a degree of ambiguity existing with reference to the auditor, that it is for these and other reasons inexpedient and impolitic for the court to interfere with such appointments; and that it be a recommendation to the company to manage their own affairs in the appointment and remuneration of such officers as they consider necessary, either as regards the auditing their accounts, the quality of the gas, or inspection of the meters."

(Hear.)

Mr. BARKLY: My Lord Mayor, I rise for the purpose of seconding the amendment. For no member of the court have I a higher respect than I entertain for Mr. Dakin, and therefore I need hardly say that I am not actuated by personal feelings. But I cannot forget that this court has no right whatever to interfere with the gas company in the management of its affairs. As an individual, I feel deeply indebted to that company for the benefit they have already conferred upon the City; but it would be a most dangerous precedent for the court to interfere with the private matters of any company. Upon a former occasion Mr. Dakin said he thought that our valuable officer (Mr. Scott) possessed the requisite qualifications for one of the appointments.

Mr. DAKIN: Mr. Scott has declined. (Hear.)

Mr. BARKLY: I am very glad to hear it, because I cannot forget that this company has already monopolised the time and talents of our respected and talented solicitor; and I trust that this court will stand aloof, and not mix itself up with the affairs of any company. (Hear.)

Mr. MORRIS: My Lord Mayor, some time since, certain members of this court cried "Oh," when my friend opposite (Mr. Taylor) enumerated some parts of his somewhat extraordinary statement, and imputed that inconvenience was felt by those gentlemen who possibly were shareholders in the new gas company. (Hear.) Although I did not say "Oh," I am not a shareholder in the new company. (Hear, hear.) I never had a share, or in any way participated in that very useful, and, I am very glad to say, prosperous undertaking. (Cheers.) I never had a share in any of the old companies, and therefore I am

not likely to abuse the new one. (Laughter.) I have been for a long time a very considerable consumer of gas; I have seen the citizens of London pay a very high price for that which chemists, and persons qualified to give a proper opinion, have declared to me to be a very inferior article. (Hear, hear.) I have seen a new company which has brought me a very good supply of a very good article at half the sum I used to pay for the same quantity. (Hear, hear.) I therefore feel exceedingly obliged to them. And, whilst that company is very usefully pursuing its onward course, I am glad to know that in the act of Parliament giving it power to issue its shares, and to conduct its operations on behalf of the public, there are certain clauses in the bill which give this court an opportunity of being the watchful guardians of the public interests. (Cheers.) When I recollect the history of great companies, especially of gas companies, not only in the City, but in large towns, it seems exceedingly desirable that the possibility of the introduction of an inferior article, the possibility of an amalgamation of this with another company, which would be calculated to work detrimentally to the public interests, should be thoroughly guarded against. (Hear, hear.) Contingencies of this description are well provided against by our having the opportunity of appointing an efficient person, whose duty it will be to see that those who cannot watch the measurement themselves, and who cannot inspect the mode of supply, shall have their interests attended to. (Hear.) This appears to be a legitimate practical duty on the part of the corporation; and I consider that, when you do that in relation to gas which shall ensure its purity, and an honest supply of the quantity charged—when you do that which shall cleanse your streets, or which shall assist to get a good supply of water for the city of London—you do a thousand times more good than boasting of your ancient charter, or of your renowned valour in days gone by. (Cheers.) I trust that the amendment of the gentleman opposite (Mr. Taylor) will be negatived, and that words will be added to the motion before the court, to the effect that the costs and charges in relation to the appointments shall be borne by the company. (Hear.)

Mr. Anderton said he considered the appointment by the corporation of a practical chemist and inspector to be the best possible security to the public, but was of opinion that the question of auditorship should be left to the company. (Hear, hear.)

Mr. Deputy Lott said he did not object to the principle of the clauses, but he did to the mode in which they would be carried out, from the circumstance of some members of the court being shareholders in the gas company. He objected to members of the court, who were sworn to maintain the interests of their fellow-citizens, and who, instead of being senators and debaters, were projectors of companies and shareholders. He should vote for the amendment.

Mr. George Taylor said that, had the hon. gentleman who introduced the amendment put in motion the functions of reason as clearly as he had exercised the faculty of speech, he certainly never would have been hurried into the expression that members of the court must be shareholders, because they adopted a particular line of action. (Hear, hear.) He thought such an insinuation exceedingly discourteous towards those members who were shareholders in the company. The mover and seconder of the amendment had argued that the court ought not to take upon themselves the appointment of persons to the offices referred to, on the ground that they would be mixing themselves up with the company. He (Mr. Taylor) asked whether the court was not specially enjoined to watch over the interests of the city of London? (Hear, hear.)

Mr. Deputy Harrison: My Lord Mayor, it seems to me the most extraordinary argument I ever heard, that this court should not adopt a resolution which is, in fact, to protect the public against any increased expense, as well as to insure any further reduction in the price of gas, when, by a proper management of the affairs of the company, the dividend paid to the shareholders will enable the company to make that reduction. My friend opposite (Mr. H. L. Taylor) has made some observations almost implying that the chairman of the gas company (Mr. Dakin) has some wish to entrap the corporation into an expense. Those observations are of a similar character to those which have fallen from his lips ever since the commencement of that company's career. The company have acted most honourably throughout, in carrying into effect the conditions of agreement upon which this corporation presented a petition to Parliament in favour of the bill, and also the conditions upon which the commissioners of sewers presented a similar petition. (Hear, hear.) My friend expresses astonishment that we should now ask to make these appointments. Why, it was one of the conditions upon which the company were allowed to lay down their pipes in the City. The expression, therefore, of astonishment at the company coming to ask that this court should make appointments, is a thing which I cannot pretend to understand. Instead of finding fault with the company, fault would have been found with them if they had not made the application now under discussion. Besides, that application is due to the court. What, on earth, can be the objection to the court now taking upon itself the exercise of the duty which is already in its own possession? Is it to be attended with any expense to the court? (No, no.) There is to be none. There may be some doubt entertained with regard to one of the clauses, but respecting two there can be none. Respecting the auditors there is none. As respects the meters, the expenses are to be paid by the company. There is some, however, with regard to the practical chemist to be appointed. My friend below me (Mr. Morris), in order to make assurance doubly sure—to remove all doubt, if any doubt did exist—proposes to add some words to the motion, to the effect that any expense incurred in consequence of the appointments for the protection of the public shall be borne by the company, whose proceedings are to be watched by the appointments that are to be made. (Hear, hear.) Nothing can be more satisfactory; and I do not at all lower this company to a mere question of shareholdership. (Hear, hear.) I am no shareholder. My friend Mr. Lott has ventured to make the assertion that there are certain members of the Court of Sewers shareholders, who unjustly and improperly influence the deliberations of that assembly upon the subject. Some time ago I certainly did subscribe, and took five shares in this company, because I wished to show them I felt, after what had taken place, that it was necessary to give them encouragement. But my friend on the floor of the court, upon a former occasion, insisted that, because I had an interest of £50 in this company, I was influenced in the particular line I was pursuing in this court. I had such respect for my own character and position that I would not permit such an insinuation ever to be made again, and, immediately upon leaving the court, I disposed of my shares, and from that time I have had no interest either in this or any other company.

Mr. Deputy Lott: You were appointed arbitrator the other day.

Mr. Deputy Harrison: If two immense companies consented to appoint me as arbitrator in a matter of dispute between them, I can only say that I feel proud of the compliment they paid me; and I feel certain that they would not have made such selection unless they had known that I could bring to their service an honest and independent judgment. (Cheers.) I will not permit insinuations of this description to be made without replying at once to them, because I feel convinced that the large body of the court will immediately acquit me of acting from any such influence as has been suggested to-day. (Hear, hear.) I have advocated this question, not because I felt personally interested in it, but because all my constituents, without exception, instructed me to do all I could to carry this act into operation. (Hear, hear.) They relied most confidently on the corporation protecting them against any increase in the price; they knew the nature of the conditions upon which the commissioners of sewers permitted this company to come into the City; they knew that auditors were to be appointed to inspect the accounts; they knew that the meters were to be inspected; they knew that chemists were to be appointed to test the quality of the gas; and, with a knowledge of all these things, my constituents unanimously instructed me to promote this measure, so that they might have secured to them the advantages which this company originally held out to the public. (Cheers.) I support these instructions conscientiously, because I believe that, the old companies having refused to do justice to the gas consumers of the City, this was the only course left open to them, and they have at length had a right accorded to them which they were long previously entitled to. (Cheers.)

Mr. Hall said he believed the Great Central Gas Consumers' Company had been most useful to the City of London, and he had no doubt it would still continue to be so; but, at the same time, he was very anxious that the corporation should not take upon themselves the responsibility that would attach to them as acting between the consumers and the company the very moment they took upon themselves the task of appointing persons to offices relating to the management of the company's affairs. (Hear, hear.) He hoped the corporation would not make the appointments in question. He considered that the citizens of London had already obtained a great advantage from the fact of a maximum price having been fixed in respect to the gas supplied by the company. He would recommend the court, in the event of their deciding upon the amendment, to strike out the words beginning with "and that it be a recommendation," to the end, and he would then agree with it. If, however, the original motion were to be carried, he hoped the words proposed by Mr. Morris would be added, so that expense to the corporation by the appointments might be avoided.

Mr. Lart was fully of opinion that the officers ought to be appointed, particularly practical chemists. He wished to ask the chairman of the company, supposing the gas should be found to be of a worse quality than was expected, what security was there against its continuance, and what steps were to be taken to procure a better supply?

Mr. Dakin: The power to enforce is, that the gas shall be better than that which was in common use before this company's establishment, and there are penalties in default.

Mr. Lart: Who are to enforce the penalties?

Mr. Dakin: The commissioners of sewers. (Hear.)

Mr. Farrar hoped the court would agree to the motion of Mr. Dakin, with the addition proposed by his friend Mr. Morris. He could state that hundreds of pounds from the ratepayers' funds had been expended by the commissioners of sewers, in the payment of fees to counsel, and in various other ways, in getting the clauses now under discussion inserted in the company's bill. (Hear.)

Mr. Dakin rose to reply: My Lord Mayor, I am very glad to see the gentleman (Mr. Taylor) who has just entered the court; for I regret exceedingly the personal tone which this debate has assumed. I admire very much the straightforward conduct of Mr. Anderton; he was formerly one of the most formidable opponents of the bill, but he is not one of those whose consistency is consistency in error. (Hear.) Directly he saw what was wanting in *bonâ fides* to enable us to carry out the project, he supported the company. (Hear, hear.) Our worthy friend (Mr. Taylor) upon this occasion has certainly been consistent, as he has been from the beginning. (Hear, hear.) He assumed to himself the fatal gift of prophecy originally. (Laughter.) He said that we should never open the streets, or lay a pipe, and that he would pawn his judgment and honour for the fact. (Increased laughter.) His prophecy has not been borne out, but he has done all that in him lay to make the facts bend to the prophecy he promulgated. (Hear, hear.) That gentleman has indulged in personal imputations upon those who are very well able to let them go by; but I think it would have been more becoming the dignity of this court, and its public usefulness, if he were taught that it would be much better for this court's deliberations, and the honour of its members, if he were less in the habit of imputing personal motives. (Hear, hear.) He has stated that we wish to entrap the court. That, upon the face of it, is denied by the fact that this motion has been upon the paper of business for the last six weeks. You yourselves petitioned for the bill when these clauses were inserted in it; and it is not becoming in that member to impute motives to another man

equally honourable as himself, nor is it conducive to our interest that debates should be spiced with so much personal acrimony as that gentleman is in the habit of introducing. He is too much in the habit, instead of arguing a question, to descend to low personal abuse. I fully admit the usefulness of that gentleman; he devotes a large portion of his time to the service of the corporation and the public, and collects a great quantity of small matters of detail; and I tell him publicly—what I have already told him in private—that I hope he will not mar his usefulness by pursuing a similar course to that which he has adopted to-day. ("Hear, hear," and laughter.) I now leave the motion in the hands of the court, in full confidence that they will do impartial justice between the constituency, the company, and themselves. (Cheers.)

The amendment was then put, and declared to be lost.

Mr. H. L. TAYLOR said he would declare in the face of the court that the gas supplied by the company was not of the quality it ought to be for the interests of the consumers.

The original motion, with the addition suggested by Mr. Morris, was then adopted.

## THE GAS QUESTION IN ST. MARYLEBONE.

VESTRY MEETING, DEC. 12, 1851.

Mr. GREENWELL, the vestry clerk, read the following report from the gas committee:—

"St. Marylebone, Dec. 12, 1851.

"At the committee appointed to consider the tender made by the Imperial Gas Company, for lighting the public lamps from the 31st day of Dec instant—

"Present: Mr. George in the chair; Messrs. Hodges, A. Hume, Powell, Nicholay, Swaine, Kirby, Soden, M'Evily, Adamson, Braess, Burden, Barrett, Simmons, Poland, Frewin, Russell.

"Your committee report—That they have considered the tender referred to them, and have conferred with the secretary of the Imperial Company thereon, and they recommend the vestry to accept the tender of the Imperial company to light the public lamps with gas, at £4. 8s. 6d. per lamp for one year, subject to a return of the difference between £3. 11s. and £4. 8s. 6d., should the pipes of no other company be laid in the district of the parish now lighted by the Imperial Company, at the end of each year, and that the batswing, consuming four feet of gas per hour, be substituted for the present four-hole burner, at the cost of the company.

(Signed) "CLEMENT GEORGE, Chairman."

Mr. GEORGE said he would move that the report be received simply, which, having been seconded and carried,

Mr. M'EVILY said he would move that the report be adopted.

Mr. BURDEN seconded the adoption of the report.

Mr. GEORGE said he would move the following as an amendment:—

"That a proposal be made to the Imperial Company to contract to light the public lamps for £3. 11s., for one, two, or three years, at the option of the vestry, with improved batswing burners, consuming four feet of gas per hour, the vestry undertaking not to consent to a competing company coming in to supply until all their pipes are laid down over the whole district now lighted by the Imperial Company, and to take sufficient security from them to ensure that object."

He expressed his astonishment that the proposal to adopt the report had emanated from the very parties who, when this tender for the £4. 8s. 6d. was made, said there was not a gentleman who dared to get up in his place to move the acceptance of such a tender, and who denounced it as an insult to the common sense of the vestry. It was said that the Gas Consumers' Company merely existed upon paper, but yet the solicitor was prepared to undertake, not to light a portion of the parish, but the whole; but the grand point was, were they to tax the ratepayers an additional penny in the pound, to raise the additional £3000 required, by accepting this contract of £4. 8s. 6d. per light, when the amendment offered all the advantages of competition?

Mr. BOUSFIELD seconded the amendment.

Mr. M'EVILY contended that, if this amendment were adopted, the parish would be as completely bound hand and foot to the Imperial Company as they had been previously. If they were determined that the competition should be free and unrestricted, which had been so repeatedly expressed by the ratepayers, then they could not accede to the amendment of Mr. George.

Dr. RUSSELL said the Imperial Company had acted very fairly in this matter. They had made the vestry two offers; the one to supply gas at 3s. per 1000 feet, and the other at 4s. per 1000 feet. The difference, however, was, that the former was mixed up with restrictions, whilst the latter rendered the vestry entirely free to admit another company when and how they pleased. The Imperial said they were not afraid of fair competition; but they did object, and very properly so too, that one company should be permitted to come in at one place, and another company at another, to take all the best of the lighting, and leave them the worst. They said they had been losers at the former price, but they fairly declared they were content to be so, if they were permitted to supply the consumers exclusively as an equivalent; but they had offered to supply the public lights, without any restriction whatever, at 4s. per 1000 feet. Now, no one could say that that was an unfair, an exclusive, or monopoly price; but the question was, whether the vestry were not bound to take the lower price; whether they were justified in taxing the ratepayers £2000 or £3000 more. He thought they were bound to take the lowest tender, and therefore he supported the amendment.

Mr. POLAND contended that there was no single gas company in a position to go over the parish, except the proposed Consumers' Company, and that was said only to exist upon paper. (Hear, hear.) A talk had been raised about reducing the public lights, but he called upon the vestry not to think of that, nor yet adopt the report, which would involve the putting on an extra penny rate.

Sir JAMES HAMILTON wished to ask a question:—Was there really such a company in existence as "The Marylebone Gas Consumers' Company," or was it merely a society *in nubibus*? Were they in a position to sign any contract?

Mr. GEORGE said he must admit, when he put a question to the solicitor, Mr. Holman, last night, he said he was not in a position to sign any agreement at present.

Mr. BEACON condemned the amendment, as being calculated to perpetuate monopoly and restrictive clauses.

MR. BURDEN also denounced it as a subterfuge to avoid letting into the parish a free and unrestricted competition.

MR. KIRBY supported the amendment, because he thought they had no right to so much increase the tax for lighting on the ratepayers, although he had no hope from this Gas Consumers' Company. He had put some questions to the solicitor who attended the committee, to ascertain whether the Marylebone Gas Consumers' Company existed only in imagination, and he thought it did. His questions were to Mr. Holman, the solicitor:—"Where is your capital?" "We have none." Who are your subscribers?" "We have none on paper." "When are you likely to begin business?" "I should say, if you give us your custom, I think, next year." (Laughter.) "When will you be in a position to enter into a legal contract with this board?" "I can't answer that." (Laughter, and a voice, "The 1st of March.") He did not think they had much to hope for from such a company.

Mr. Soden, Mr. Nicholay, Mr. Hodges, and Mr. Row supported the original report; whilst Messrs. Whitmore, Buckton, and other gentlemen spoke in favour of the amendment.

After a very long and animated discussion, the question was put, and the original resolution was carried, on a show of hands, by a large majority.

A division was demanded, when there appeared—

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| For the adoption of the report .. ..... .... | 35 |
| For the amendment ..... | 15 |
| Majority for adopting the report, and consequently the tender of the Imperial Company ..... | —20 |

Another report was then presented from the gas committee, with reference to the Consumers' Company, as follows:—

"St. Marylebone, Dec. 12, 1851.

"At the committee, appointed to consider the memorial of the Gas Consumers' Company—present, Mr. George in the chair, and the same members.

"Your committee report: That in their opinion it is desirable that some assurance should be given by the vestry to the memorialists that in the month of March next the vestry will be prepared to permit the Consumers' Company to lay down their mains throughout the parish, upon the terms of their resolutions on the 22nd of March last.

(Signed) "CLEMENT GEORGE, Chairman."

This report was adopted.

VESTRY MEETING, DEC. 19, 1851.

SETTLEMENT OF THE GAS CONTROVERSY.

Mr. WHITMORE gave notice of his intention to move the non-confirmation of the minutes of last Saturday on the gas question.

Mr. GREENWELL, the vestry-clerk, said he had several communications on the subject, which he would first read; they were as follows:—

"At a meeting of the Gas Consumers' Protection Committee, held at the Mitre Tavern, New Church-street, on the 15th day of December, 1851, Mr. E. Hoare in the chair—

"Resolved: That this meeting view with great satisfaction the vote of your hon. board on Saturday last, to allow the St. Marylebone Gas Consumers' Company to lay down their mains in March next, and the committee thank the vestry for breaking up the gas monopoly.

(Signed) "EDWARD HOARE, Chairman."

"Imperial Gas Light and Coke Company, 33, John-street,
"Bedford-row, Dec. 19, 1851.

"Dear Sir,—We have received a letter from the managing director of the Sheffield United Gas Company, wherein he states that, 'having seen it reported in the GAS LIGHTING JOURNAL that the chairman of the vestry meeting of St. Marylebone, held on the 15th of November, had stated, that at Sheffield gas was supplied at 2s. per 1000 feet, he thinks it right to say, that the price of gas to consumers in Sheffield is 5s. per 1000 feet, and not 2s. as is there stated;' and he adds, that the price charged for the public lights is at the rate of 4s. per 1000 feet. I believe that the misstatement herein referred to was not made by the chairman of the vestry, but by a member of the deputation that waited on the vestry on that day; but, as the court of directors of this company feel every confidence that the vestry of St. Marylebone desire nothing but the truth, they have instructed me to forward to you the enclosed printed list of prices which accompanied the letter from the Sheffield Gas Company, and to request that you will take the trouble to read this communication to the vestry.

"I am dear sir, yours, faithfully,

(Signed) "ALEX. HENRY, Sec.

"W. E. Greenwell, Esq., Vestry Clerk, St. Marylebone."

"Western Gaslight-office, 9, Holles-street, Cavendish-square.

"My Lords and Gentlemen,—On the 24th of October last this company addressed you a letter, offering to lay mains in Oxford-street and other places in your parish. The directors regret that they have not been favoured with any reply to such letter. They gather, however, from the newspapers, that it received your full consideration, although the offer was at first almost unanimously accepted; and, although a committee subsequently reported in favour of that course, yet an adverse division afterwards took place, which the directors presume they may take as a rejection of the company's proposal.

"On the 21st ult. application was made for your permission to lay a pipe, about 200 yards in length, to convey the company's gas from its mains at the Regent-circus to these premises; and an undertaking was also forwarded to you that the gas should not be used, without further leave, on any other than these premises. The directors regret that they have not been favoured with any reply to this application, and they are unable to gather from the newspapers how the matter stands.

"The directors have had their attention drawn to your recent advertisement, calling upon gas companies to tender this day for the public lighting of the whole or any portion of the districts now lighted by the Imperial Company. This advertisement was under the consideration of our board, with a view to decide upon what terms the company should tender for such public lighting, when the directors learned that, since the issue of the adver-

tisement, you have agreed to a new contract with the Imperial Company for continuing to light the whole of its present districts, with a stipulation that that company shall pay you a yearly sum of money if you do not permit competition.

"In the presence of this unexpected proceeding, and of the unsuccessful result of the many past negotiations between your board and this company, the directors have come to the conclusion that it would be unwise for them to send in any tender at this moment, by doing which they would only publish the future policy of the company to its opponents.

"I have, &c., (Signed) "S. Barber, Secretary."

Mr. Whitmore then rose to move the non-confirmation of the minutes of the previous Saturday, so far as related to the acceptance of the tender of the Imperial Company to light the public lights at £4. 8s. 6d. each light. He admitted that a large majority had decided in favour of this proposal, but, so far from wishing to pursue a factious course, he had moved the non-confirmation of the minute simply for the purpose of saving an unnecessary outlay of £2600 of the money of that parish, and, if there were no other reason, that alone would justify the step. If he took a retrospective view of what had taken place in that vestry, he could not but feel surprised at the monstrous inconsistency of gentlemen who, so far from having shown any fixed principle on this subject, had declared this offer of the Imperial Company to charge for the public lights £4. 8s. 6d. an insult to the parish, and had asked who would be bold enough to move the acceptance of such a contract, and then coming down themselves a few days after to move that it be adopted. In the first place it was a *sine quâ non* that they were to pay this £4. 8s. 6d.; but, if there were no pipes of other companies laid, they were to have 17s. 6d. returned. He contended that this was a premium to the vestry to shut out competition, and that, for the fear of the extra cost of £2600, the vestry dare not let another company in. He would contend that this was the greatest blow possible that could be offered to competition. On the other hand, he was prepared to show that the amendment of Mr. George, if adopted, of making a contract at £3. 11s., on condition that no company be allowed to light, offered greater advantages, and tended more to the security of competition all over the parish. It would admit as many companies as chose to come, without risking more than the present price of £3. 11s.; and it would be to the advantage of the Consumers' Company also, because, if they went over the whole parish, the whole parish would support them, which they could not do if they only went over a particular district. The Consumers' Company said, in a circular they had sent round, that they would supply their gas at 4s. per 1000 feet. Now, at £3. 11s. each public light, the charge by the Imperial was but 3s. per 1000 feet. He contended, if the report were *non-confirmed*, and Mr. George's proposal carried, they would give the advantage for a company to come in and benefit the whole parish; whilst, if it were adopted, the vestry would be obliged to become monopolists for the next 12 months, because they could not see the advantage of admitting another company equivalent to the loss of £2600 if a single pipe were laid.

Mr. Clement George seconded the non-confirmation.

Mr. Beacon ridiculed the non-confirming mania which had sprung up, he said, in the vestry, and said no company would be foolish enough to come in then. And he very much doubted, after the injustice of that vestry to the Western Company, whether they would get companies to come at all. He believed that day was appointed to receive tenders to light the parish of Marylebone with gas, and he would ask the vestry clerk if they had any tenders sent in?

Mr. Greenwell: Not one.

Mr. Beacon: No; the companies are not such a set of fools to do so.

Mr. Soden defended himself from the charge of inconsistency, and said he had not the slightest apprehension that the decision come to on the previous Saturday would be confirmed that day, inasmuch as it was backed by the repeated public expression of opinion, on the part of the ratepayers, that there should be free and unrestricted competition, at whatever cost, whilst the proposal of Mr. George and his friend Mr. Whitmore had met with no support out of doors at all. Was it not absurd to expect any company, especially a new company, to go over the entire of that parish, and lay 75 miles of main before being permitted to light a single light? (Hear.) Did they suppose it likely that any company, or any body of men, would be such a set of donkeys as to lay out £80,000 before they could receive one single sixpence? (Hear.) There was no company that would be fools enough to do it. (Hear.) He denied that the vestry would be deterred by the bribe of the £2600 not to let in any company that offered in a *bonâ fide* manner.

Mr. M'Evily supported the confirmation of the report, and Mr. George spoke in favour of the non-confirmation.

Mr. T. D'Ifpanger, jun., called upon the vestry not to be led away by the sophistry of Mr. Whitmore and Mr. George.

Mr. Hodges complained of the attempt to reopen this question, within a period of 11 days from the expiration of the present contract, and in defiance of the feeling out of doors for free and unrestricted competition. It was far more honest to move to go back to the old system at once, for that was what the amendment of Mr. George in reality amounted to.

After a few observations from Mr. Burden, Mr. Simmonds, and Mr. Michie, the question was put, and the confirmation was carried by an overwhelming majority, thus finally settling the gas question.

On the other portion of the minute, adopting the report admitting the Gas Consumers' Company to lay their mains after the 1st of March next,

Mr. Whitmore withdrew his notice for non-confirmation as applied to that, and expressed his approval of it.

That report was then confirmed, and the vestry separated.

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Surrey Consumers' Gas Association.—If Paris has had its *coup d'etat, en grand*, London has not escaped one, though it may be only *in petto*. The result of the movement here has, however, been the reverse of its great Parisian prototype; inasmuch as, in London, the *outs* have got *in*, and the *ins* are turned *out*; so, at least, we learn from a batch of anonymous pamphlets transmitted to us, some of them bearing the piquant headings, "What's Up?" "Who's Down?" and "What's the Price?" The actual cause of the crisis appears not to have been any clashing of the executive with the legislative powers; but in the exasperation of the Surrey consumers of gas at the inadequate supply afforded them by their favoured company. A Gaelic Changarnier volunteered to head a revolution in his own interest, and, the conditions having been agreed to, it was quietly effected on the evening of the 24th ult., with the assistance of a strong brigade of the heavy infantry, vulgarly known as navigators. Sweeping changes of this character must, of course, be accompanied by proclamations and manifestoes, and the parallel holds good, even to these minutiæ. Here are two of them:—

"Coleman-street, Dec. 20, 1851.

"Gentlemen,—Having been requested by Mr. Thwaites to examine the works, I did so in the company of Mr. Thwaites, the deputy-chairman, and the engineer; I found the works in the most deplorable condition. The first thing that attracted my attention was the want of any means of condensing the gas, beyond the connecting main running across the yard from the retort-house to the purifying-house. It is quite true that, although the small amount of cooling surface may be sufficient with the present small production of gas, it would be altogether inadequate for the necessary condensation, supposing the quantity of gas produced was at all commensurate with the requirement of the district; but by far the most important defects in connection with your works is the mode in which the retorts have been set and are now worked. Taking into consideration the size and length of these retorts, they ought to produce at least three times the quantity of gas which, even according to Mr. Hedley's statement, they are now making. When at the works, it being within half an hour of sunset, the gas-holder contained less than 30,000 feet of gas, and the pressure exerted on the mains at that time was certainly not a pressure which could afford a proper light to the consumers, and the quantity could not last, with a proper pressure, two hours. As regards the economy of production, and the probable profit at 4s. per 1000 cubic feet, I have not the slightest hesitation in saying, that, if a correct statement of the coals and fuel used, the labour, and wear and tear, were obtained, instead of a profit, every 1000 cubic feet registered by the consumers will cost 5s. per 1000 cubic feet. I have submitted a proposition to your solicitor, Mr. James, which he has, no doubt, properly explained to your board; and I have only to observe that I regret having to make such a report as my position compels of the works in this case; but at the same time, although Mr. Hedley has been injudicious, and failed in the objects contemplated by your company, still his labour, anxiety, and mental and bodily exertion, must, no doubt, have been considerable. I therefore propose, that, if the company should accept my proposition, Mr. Hedley should receive some compensation commensurate with his labours. "Your obedient servant,

(Signed) "A. A. Croll.

"To the directors of the Surrey Consumers' Gas Light and Coke Association."

"Hibernia-chambers, London-bridge, Southwark,
"Dec. 27, 1851.

"To the Shareholders of the Surrey Consumers' Gas Light and Coke Association.

"Gentlemen,—In the conscientious performance of the duties confided in us by the shareholders, and for the protection of their interests, we have, after a most anxious and careful investigation, felt it to be our duty, though painful and disagreeable, to take energetic and prompt measures for placing the executive department of the association in other hands.

"We would carefully abstain from any publication detailing the causes which, in our opinion, have rendered such measures necessary; but, at the same time, we are quite prepared, should we be compelled, in consequence of 'anonymous' publications or otherwise, to enter fully and publicly into all the details which have rendered these prompt measures necessary.

"A proposal is now before the board for a lease of the works, and is under consideration, but no lease will be executed without the previous approbation of a majority of the shareholders; and, should we determine to recommend to the shareholders the leasing of the works, a special extraordinary meeting, as directed by the deed of settlement, will be immediately called to take it into your consideration.

"In the meantime we only ask you to suspend your judgments, and to turn a deaf ear to anonymous or out-of-door statements about our proceedings.

"We have the satisfaction of stating, from what has been already accomplished, our confident hope that for the future the supply of gas will be fully equal to the demand, and your several interests in the association considerably increased in value.

"I am, gentlemen, on behalf of myself and co-directors,
"Your most obedient servant,
"J. A. Douglas, Chairman."

The facts of the case appear to be briefly these:—Either from want of funds, or some other unexplained cause, the apparatus at Mr. Hedley's disposal was totally inadequate to the production of the quantity of gas required to meet the present winter demand; and, for some weeks past, great dissatisfaction has existed amongst the consumers, many of whom have consequently gone back to the old companies. It therefore became imperative to terminate so deplorable a position, and hence the *coup*. None can doubt the ability and energy which Mr. Hedley has exhibited in the difficult position he so chivalrously assumed; but, with the materials at his command, certain failure might confidently have been predicted. Indeed, Mr. Croll had long since recoiled from encountering the task, having at one period held the appointment of engineer, which he threw up, on finding the slender fund upon which reliance could be placed. The whole affair should serve as a warning to engineers, having any character to lose, how they risk it without due consideration.

The Gas Movement in Oxford.—In consequence of the energetic steps which have recently been taken by the gas consumers in this city to obtain gas at a reduced rate, by the establishment of a new company, a special general meeting of the proprietors of the old company has been held in the Town-hall committee room, when it was unanimously resolved to reduce the price of gas to general consumers at Lady-day next, from 6s. 8d. per 1000 feet to 4s. 6d., and a circular to that effect has been issued. A meeting of the committee of the Oxford Gas Consumers' Company was subsequently held, when the

following resolutions were adopted, and transmitted to the committee of management of the old company:—"That the committee of the Oxford Gas Consumers' Company cannot consent to withdraw their prospectus, or relax their exertions for the establishment of a new company, unless the old company shall consent—First, to undertake not to raise the price of gas at any future time beyond the present announced sum of 4s. 6d. per 1000 feet.—Secondly, to limit their profits to 7½ per cent. per annum upon £14,400, their paid-up capital, and apply all available moneys and means to the future reduction of the price of gas in this city and university.—Thirdly, to re-construct the present works, or to render them capable of supporting the increasing demand of the general body of consumers.—Fourthly, to pay, upon the effectual retirement of the new company, the costs and expenses which they have incurred in the promotion and carrying on of their undertaking, and in reference thereto."

Croll v. Edge.—This suit has been finally terminated, and the costs of the defendant duly paid. The legal profession is said to have profited to the tune of £4000 during the litigation of this protracted suit.

Application of Wood and Coal Tar to the Dyeing of Silk.—We find the following communication in a Manchester periodical:—"For a long time past silk dyers have attempted to employ several kinds of dye stuffs to produce yellows having a golden hue, that is to say, colours which give to silk fabrics the appearance of gold thread. These colours are always more or less injured by the atmosphere, as they are principally obtained from bark, verdue, turmeric, &c., the dyes of which are all rapidly injured by the oxidation of the air, and are also injured by perspiration; therefore, I hope to render a service to the numerous dyers of silk in this neighbourhood, by giving a cheap process for obtaining fast golden yellows. This means consists in putting into a large earthenware vessel a sufficient quantity of nitric acid, of from specific gravity 1·36 to 1·40, or of from about 70 to 80; twaddle to fill one-third part, and then adding coal or wood tar in small proportions. When coal tar is used, the acid should be gently heated, either by the direct action of fire, or by the vessel being placed in boiling water; but, when the chemical action of the acid upon the tar has commenced, the heat must be withdrawn until near the end of the operation, when it must be again applied. But, when wood tar is employed, no heat is required to facilitate the chemical action at the commencement of the process, but only near the end. When the nitric acid is nearly decomposed, and has transformed as many of the products of the tar as it is able into nitropieric or carbazotic acid, the liquor is removed, and the remainder of the tar, which has undergone no change by the continued action of the nitric acid, is then well washed several times with boiling water, and the liquors therefrom are added to that first obtained, the whole of which is then filtered or allowed to settle. In dyeing with this liquor no mordant is required, which is a great advantage, it being only necessary to dip the silk into a very weak solution of this impure carbazotic acid, to which is added $\frac{1}{1000}$ part of sulphuric acid; and the deepness of tint and shade does not so much depend on the strength of the solution as upon the length of time the silk is allowed to remain in it. When the silk is taken out of the bath, it merely requires to be slightly washed, wrung, and dried. The shades may, if the dyer thinks proper, be easily modified, by adding to the wash different dye-stuffs. This process is very little more expensive than the use of bark, I having found by experience that 100 grains of carbazotic acid will readily dye 2 lbs. of silk to a good depth of shade. This process, but much more complicated than as above described, was communicated to me by a French silk dyer of Lyons, with permission to do whatever I thought proper with it."

Cannel Coal Gas.—We have been to see the gaslight at Messrs. Allhusen and Co.'s manufactory, South Shore, and have now returned to the inferior gaslight in the High-street—the former made from the cannel coal of our neighbour's pit at Blaydon (Mr. G. H. Ramsay's)—the latter made from we know not what. The one light is white and brilliant—the other resembles, in great part, sky-blue milk. Mr. Allhusen's neighbours are begging of him to supply them with cannel coal gas; and one of them, who has had his prayer granted, asked us to look at the two lights—his new light and the old light—and mark the difference. One-half of the new gas, he states, will give as much light as the old, and a better light. Wherever we saw the cannel light, the consumers were unqualified in its praise; and the talk is, that "we really must have a Gateshead Cannel Coal Gas Company." *Gateshead Observer.*

The Electric Light.—The Brussels *Independence* thus narrates the attempt to apply this system to the lighting of the Belgian Chamber of Deputies, made onthe 23rd ult.:—"Yesterday evening, in presence of a large majority of the members of the Chamber, of several senators, scientific notabilities, among whom we observed Messrs. Quetelet and Stas, and of a few ladies, M. Melsens attempted the lighting of the hall in which the representatives meet, by the electric light. Up to the present time candles have been resorted to, which lighted the seats of the Assembly, but left the upper part of the hall in the most complete obscurity, and with the slightest current of air the flames vacillated, smoked, or became extinguished. For some time past the questors have contemplated the adoption of a more suitable mode of lighting. Gas would have been introduced last year, had the budget permitted it. A fortnight since an attempt was made at lighting with 50 carcel lamps, which, however, encumbered the desks, much to the inconvenience of the members; and, thanks to the shades, gave so little light, that they disappeared next day. Since then candles have continued their uninterrupted reign till yesterday, when the electric light was put to the test. Batteries were placed in the corridor which surrounds the public gallery, and from thence wires were carried to the charcoal points placed on the balustrade below the president's seat. The experiment began with one light; afterwards a second was added, fixing them in various situations round the front of the gallery. It is well known that the electric spark is of a brilliant and superb clearness. The light is so pure and immoveable, that shadows have all the vigour and relief which those of a summer's sun have at noon day. Profiles are traced on the walls with an astonishing precision. Lamplight is a smoky gloom beside this brilliancy. A single light, without ground glass shade, afforded almost sufficient illumination. The members saw, the public gallery was seen, and the reporters' gallery could almost see; but with a ground glass shade all became invisible to them. With two lights the effect was blinding, the more so as it became necessary to put the one in line with the other, so as to divide the centres of the light. If it is possible to use the lamps in conjunction with the electric light, our advice to the questors (since they have done us the honour to ask our opinion) would be to retain the electricity for the Chamber, and to leave us (the reporters) our lamps. We doubt, however, whether the Chamber will accommodate itself to this change. There are two capital defects: Its light is intensely fatiguing for the eyes, and, notwithstanding all its brilliancy, it is not white; objects take a green tinge, unnatural, and, therefore, uncomfortable. We do not know how far the expression may be appropriate, but we do not find ourselves at home with this light. Perhaps one may become habituated to it. We know not whether the Chamber will adopt this system of lighting. Its defects may possibly be alleviated by reflectors, shades, &c.; but it seems to us that there is another system clearly indicated, and that is, a row of gas lustres fixed to the columns all round, as at the Théâtre of St. Hubert. The candles can be retained till these fittings can be placed."

Fatal Explosion at Highgate.—On the evening of Saturday last this quiet suburb was the scene of a most appalling accident, which has since resulted in the death of one of the parties concerned, consisting in the explosion, by ignition, of a patent spirit lamp. The facts of the case may be stated very briefly. Two gentlemen were on the eve of passing their examination as law students, and but for this fatal event would probably have passed in company on the 21st instant, preparatory to their entering upon practice as solicitors. Their names were Edwards and Foster, the latter being a son of Sir William Foster, at Norwich. Both resided at Highgate, the former having done so for five years, and, as they were studying together, a very close intimacy had latterly existed between them. Mr. Edwards lodged at a cottage near "The Woodman," which is on the Hornsey side of Highgate; Mr. Foster at Ivy Cottage, situated on the hill, just beyond the Cemetery. On Saturday Mr. Foster visited Mr. Edwards, without any previous appointment, and stayed to dinner. Some time after dinner the two friends walked to Ivy Cottage, and there they remained together, in Mr. Foster's room, till the accident occurred. It appears that, about eight o'clock in the evening, Mr. Edwards was sitting at the table reading. Just before him, on the table, was a spirit-lamp with which the room had been lighted, but which now required to be replenished with liquid. Mr. Foster rose to supply the lamp with spirit; and just after he had done so he was proceeding, candle in hand, to relight it, when a terrific explosion arrested his movements. On recovering a little from the shock, he beheld his friend, Mr. Edwards, enveloped in flames, the liquid having been scattered over his chest and entire person, and the saturated clothes having then ignited. Mr. Foster, who was himself fortunately unhurt, immediately rushed to his friend's assistance, and endeavoured with all his might to extinguish the flames. Not succeeding, he caught hold of his unfortunate companion, and, by a desperate exertion of strength, almost carried him first down stairs, and then into a small garden at the back of the house, where, by rolling him on the ground, he at length succeeded in extinguishing the flame; having, however, been himself sadly burnt through his generous efforts. Mr. Brendon, a surgeon, residing about a hundred yards from the spot, and a friend of both the sufferers, was immediately sent for; and, while this gentleman attended personally to Mr. Edwards, his assistant performed a similar service for Mr. Foster. Mr. Edwards's injuries were at once discovered to be severe and dangerous. The chest and both hands were fearfully burnt; the face was actually blackened by the carbon of the exploded spirit. The case did not appear hopeless until Sunday evening; but, though Mr. Brendon sat up with his patient for two nights, and did all that could be done for his relief, death took place on Monday morning, its immediate cause being apparently the irreparable shock sustained by the nervous system at the moment of the accident. It is gratifying to state that the gentleman who so nobly risked his own life for the sake of his friend continues gradually to improve, and is now progressing favourably towards complete recovery. The event has caused the deepest distress to Mr. Edwards's parents and other relatives. One brother of the deceased resides at Hampstead; but with that exception the family, which is numerous, resides at a considerable distance in the west, and, having received a telegraphic communication, they all set off instantly for London. As regards the precise cause or manner of the accident, it seems impossible to speak with certainty, Mr. Foster having been so stunned by the explosion that he declares that he cannot recollect distinctly anything that immediately preceded. It may, however, be conjectured, as a probable solution of the calamity, that the lamp having gone out, the smouldering spirits had a tendency to attract the flame of the candle, and thus to produce ignition and combustion, something similar to this having been frequently observed in the relighting of common candles. We may add that, on public grounds, it seems most desirable that spirit lamps, set forth as "patent," "peerless," "self-gas-generating," and so on, should be subjected to some safety-test, in order that the properties, whatever they may be, of their combustible fuel may not again lead to such lamentable results. The lamp bears the inscription "Holliday's Patent Peerless Gas Lamp, 128, Holborn-hill," and was purchased there by Mr. Foster. The inquest is adjourned till the 22nd, when it is hoped that gentleman will be sufficiently recovered to attend.

## ADVERTISEMENTS.

### METROPOLITAN WATER.

N.B. *That large portion of the public whose money is invested in private enterprises, on the faith of recent acts of Parliament, is requested to peruse the following letter, from the Chairman of Lambeth Waterworks Company to the Secretary of State for the Home Department*:—

Belvidere House, Wimbledon, Surrey, Dec. 2, 1851.

SIR,—The re-appearance in the public newspapers of a notice of application to Parliament, signed by Messrs. Lyon, Barnes, and Ellis, relative to the metropolitan water supply, and also relative to the water supply of rural districts several miles distant from the metropolis, obliges the Lambeth Waterworks Company, through me, their chairman, to address you.

Before proceeding further, I beg to observe that this company is placed under the most modern legislation. So very recently as 1848 it applied to Parliament for leave to bring in an abundant and pure supply of water from Thames Ditton, for the purposes of the southern portion of the metropolis, and of certain rural districts. Parliament highly approved of the application, and "The Lambeth Waterworks Act, 1848," was passed. Under the faith and powers of, and relying upon, the terms and status conferred by that recent Act of Parliament, two hundred thousand pounds (£200,000) have been subscribed, and large further sums borrowed from the public, in addition to the former capital of the company, whereby a supply inexhaustible, and now universally admitted to be excellent, and (owing to the large volume of the Thames there) superior to other sources, has been achieved; and, as the chairman of this company, I am proud to be able to state, that this great public benefit has been economically effected by the inherent energy of the principle of private enterprise, while the Board of Health, which professed to deal with the question, had not proceeded beyond theory, or rather impracticable speculation. A glance, also, at the minutes of evidence before the committee of last session, on the water supply, will show a striking contrast between private enterprise and public bodies; it will there be seen that commissioners, popularly elected, had either refused to act at all, or had, as in the case of the Edinburgh Improvement Commission, wasted the public money at a rate of five times more than was beneficial to the public; so that the inhabitants are described by an eminent witness as entertaining "the greatest thankfulness" that the commission "had come to an end;" that municipal bodies had made the water supply a political question; that in the case (among other instances) of the Southampton corporation, the Itchen was the Tory river, and the Test was the Whig river, so that the town has drunk of neither, and only from 1,800 to 2,000 houses were supplied with water, out of 6,000 houses; that Liverpool and its corporation were distracted by the water supply question; and that the greatly overcharged gas consumers of Manchester have been and are paying the corporation higher than other towns for gas, inferior to that used in such other towns, thereby furnishing a large annual surplus on the gas account; and that half such suplus (such half amounting to about £15,000 a year) has been and is applied towards the large water supply expenses, in relief pro tanto of the water consumers, the gas consumers and water consumers being by no means wholly identical bodies. For the sake of brevity, I do not allude to the cases of Worcester, Dundee, Oxford, Dunfermline, &c., but beg to refer to the minutes of evidence.

I further beg to state that there is no waterworks company in the United Kingdom subjected to any modern principles of legislation to which the Lambeth Waterworks Company is not subjected by the act of 1848. It is thereby (among other things) subjected to—

The Waterworks Clauses Act,
The Companies Clauses Act,
To such limitation of rates as the committee of the House of Commons thought just with reference to the intended outlay.
To limitation of dividends; and
To constant supply.

Such having been the state of matters in the last session of Parliament, I most respectfully say that this company felt it to be an extreme hardship to be then obliged to spend a large sum out of the moneys which (relying on their recent act of Parliament), they had hoped to spend in useful public objects, in opposing the bill of last session, up to the time when it was thrown out by the unanimous vote of the honourable committee of the House of Commons; and I am truly grieved to state that this company feel it to be a matter of just surprise and regret that they should have to look forward to the absolute necessity of a similar unprofitable expenditure in the next session of Parliament, in opposing a bill which, if it be drawn according to the standing orders, must, of necessity, be in pursuance of the notice given, and must therefore embrace those very principles, or some of them, which were negatived last session, and to which, I say it most respectfully, and in the fullest reliance on the tried justice of yourself and of Parliament, this company can never consent.

I beg, at the same time, that it may be clearly understood that we are far from attributing to the Government, or to yourself as a member of it, the provisions or details of the bill of last session, or the form of the fresh notice before alluded to. We believe, on the contrary, that both the Government and yourself only desired, in the last session, to submit to the consideration and decision of Parliament, according to its usual rules, this important question; the details were necessarily left to be prepared elsewhere; and I shall be able to show you in what manner they were prepared.

For the present, however, again guarding myself against being supposed to attribute to Government the details of the bill of last session, I beg to call your careful attention to that bill. Its effect may be fairly stated to be as follows:—

1. A forced amalgamation, and thereby a compulsory throwing together of the moneys and affairs of parties who may be composed of both the provident and improvident, and practically a giving the exertions and energies of the enterprising to others, who, instead of receiving a gift, ought to exert themselves. (See Metropolis Water Bill, 1851, sections 1, 2, 3, 4, 5, &c.)

2. A compelling of the Lambeth Waterworks Company (who had so recently, to the great satisfaction of Parliament, achieved the Thames Ditton source of supply) to abandon that excellent source, if required so to do by the Secretary of State, and instead thereof, at the requisition of the Secretary of State, upon the suggestion of the Board of Health, or indeed of any other persons, to expend this company's funds (raised on the faith of another purpose) in bringing water from other sources to be pointed out, which (after the expenditure of the money) would, as every practical mind believes, have left London without its supply; such, for instance, as the Bagshot Sands source, which, even with the addition of the water from the Green Sand district, is admitted to be utterly deficient in quantity, and bad in quality; or the Woolmers Spring, in Herts, a feeder of the river Lee, which an official witness stated as yielding about 2,000,000 gallons daily, but which has been dry for the last two months; or the Darenth and Wandle rivers, which are comparatively small streams, and subject to the same fluctuations as all rivers in the chalk and limestone districts, and the quantity of water in which has been seriously reduced during the last summer and autumn, &c. (See sections 22, 23, 26.)

3. A compulsory taking away and injuring of the rates, dividends, and general status upon which (as solemnly secured to them by Parliament so recently as 1848) this company has just raised an additional capital of between £200,000 and £300,000. (See sections 27, 28, 29, 30, 31, &c.)

I next beg to state an important fact. This company having been incorporated in 1785, and having relieved its district from a great dearth of water, there appeared a rival company, which insisted upon competing, procured an act to be passed, and did accordingly compete with the Lambeth Waterworks Company. Of this rival company (now, since its junction with another, called the Southwark and Vauxhall Company) a gentleman of eminence is the chairman. The Lambeth Waterworks Company, by its energy and outlay, has, in achieving the Thames Ditton source of supply, outstripped this competitor. Of course, if that competitor could have succeeded by legislative enactment in forcibly uniting itself to this company, the competitor would have been immensely benefited, however much the Lambeth Waterworks Company and the public would have suffered, and however great the blow given the great principle of private enterprise.

Such was the state of things when the bill of last session appeared, the enactments of which certainly would have given to the Southwark and Vauxhall Company the benefit of the enterprise and outlay of the Lambeth Waterworks Company; and such is still the state of things now, that the notice of application for a bill to effect (so far as notice is an indication of the intended bill) the same object has reappeared.

The Lambeth Waterworks Company entertains, Sir, the deepest respect towards you, and confidence in your determination to uphold what is just, and in accordance with the faith of Parliament; and we are well assured that, when the bill of last session was introduced, you were not made acquainted with the above-mentioned circumstances, which this company afterwards embodied in their petition against the bill, upon which petition they were heard before the committee.

I next beg to call your attention to the minutes of evidence given before the committee on the Metropolis Water Bill of last session, questions 1348 to 1361 inclusive, and to assure you that, when the right honourable and gifted chairman of that committee put those questions to the secretary of the Southwark and Vauxhall Company, there was scarcely a person in the crowded committee-room entertaining a doubt as to who was practically the author of the main provisions of the bill then under discussion, or of his influence and co-operation with the acting portion of the Board of Health; and I take the liberty of the more especially pointing your attention to this, because the Lambeth Waterworks Company feel that, in truth, it is their public spirit and enterprise, which, in outstripping a competitor, have brought upon them the trouble and expense of a periodical agitation, attack, and defence.

Upon this point I would also point your attention as to who were some of the chief witnesses called in support of the bill last session; they were—

1. Mr. Rosseter, the secretary of the Southwark and Vaxh all Company.
2. The chairman of the same company; and,
3. Mr. Joseph Quick, the engineer of that company.

We respectfully protest against the acting portion of the Board of Health being allowed to interfere with and embarrass the due working of that well-tried and great principle, private enterprise, by which this commercial empire has, under Providence, mainly achieved its greatness; and, especially, we feel that it would be truly unjust that the Southwark and Vauxhall Company should be allowed to cripple the free development of, or to appropriate the fruits of, the Lambeth Company's own enterprise, and of the talent of the Lambeth Company's engineer, Mr. Simpson, to whom alone (as encouraged by our enterprise and outlay), and to no other, is due the merit of the Thames Ditton supply, and the striking conceptions and works by which his tried and well-known practical experience has thus far carried it out.

To an inspection of those works I beg respectfully to invite yourself and any other members of the Government, whenever convenient to you.

I beg, also, to enclose a print of the petition which this company presented against the bill of last session; and, in the language of entire moderation and unfeigned respect, but at the same time of entire firmness, to express the plain sense of duty which this company feels of opposing, with every energy, the principles (whenever renewed) which were so embodied in that bill.

(*Continued at last page but one.*)

# Share List.

THE PRICES QUOTED ARE THOSE AT WHICH THE LAST SALES HAVE BEEN MADE.

*The Companies whose names are printed in italic type are incorporated by Act of Parliament.*

| Number of Shares issued. | Amount per Share | Name of Company. | Amount paid up per Share | Dividend per Cent. per Ann. | Price. |
|---|---|---|---|---|---|
| | £ | **ENGLAND.** | £ s. d | £ s. d | £ s. d |
| | | Aberdare | | | |
| | | Aberystwith | | | |
| | | Abingdon | | | |
| | | *Accrington* £7000 | | 5 0 0 | |
| | | Albrighton | | | |
| | | Alcester | | | |
| | | Alford, Lincolnsh. | | | |
| | | Alfreton | | | |
| | | Aluwick | | | |
| | | Alston Moor | | | |
| 250 | 10 | Alton | 10 0 0 | 5 0 0 | 10 0 0 |
| 800 | 5 | Altrincham | 5 0 0 | 6 0 0 | |
| | | Amlwch | | | |
| 160 | 10 | Ampthill | 10 0 0 | 5 0 0 | 10 0 0 |
| 350 | 10 | Andover | 10 0 0 | 6 0 0 | 11 0 0 |
| | | Appleby | | | |
| | | Arundel | | | |
| | | Ashbourn, Derby | | | |
| | | Ashburton | | | |
| | | Ashby-de-la-Zouch | | | |
| | | Ashford, Kent | | | |
| 1600 | 25 | *Ashton-under-Lyne* | 25 0 0 | 10 0 0 | 52 0 0 |
| | | Atherstone | | | |
| | | Axminster | | | |
| 225 | 20 | Aylesbury | 20 0 0 | 5 0 0 | 21 0 0 |
| | | Aylsham, Norfolk | | | |
| | | Bacup, Yorkshire | | | |
| | | Bakewell | | | |
| | | Baldock | | | |
| 140 | 25 | Banbury | 25 0 0 | 10 0 0 | 50 0 0 |
| | | Bangor | | | |
| 500 | 5 | Barking, Essex | 4 10 0 | 5 11 0 | 5 0 0 |
| 250 | 10 | Barnard Castle | 10 0 0 | 5 10 0 | 10 15 0 |
| | | Barnet | | | |
| | | *Barnsley* £6000 | | 7 10 0 | |
| 100 | 20 | Barnstaple | 20 0 0 | 5 0 0 | 23 0 0 |
| | | Barton | | | |
| 120 | 25 | Basingstoke | 25 0 0 | 8 0 0 | 28 0 0 |
| 2400 | 20 | *Bath* | 16 0 0 | 6 0 0 | 25 to 30 |
| | | Battle £2000 | | 6 0 0 | |
| 56 | 26½ | Bawtry | 26 10 0 | 5 0 0 | 25 0 0 |
| | | Beaumaris | | | |
| | | Beccles, Bungay, and Lowestoft | | | |
| | | Bedford | | | |
| | | Bedworth | | | |
| | | Belford | | | |
| | | Bedale, Yorkshire | | | |
| | | Belper | | | |
| | | Beminster | | | |
| | | Berkhempstead | | | |
| 700 | 5½ | Berwick-on-Tweed | 5 10 0 | 6 8 0 | 5 15 0 |
| | | Beverley | | | |
| | | Bewdley | | | |
| 280 | 10 | Bideford | 10 0 0 | 6 0 0 | 10 10 0 |
| | | Biggleswade | | | |
| 160 | 10 | Bicester | 10 0 0 | 5 0 0 | 10 0 0 |
| | | *Bilston* £15,100 | | 8 0 0 | |
| | | Billericay | | | |
| | | *Bingley* £7400 | | 4 0 0 | |
| | | *Birkenhead* £70,000 | 35 0 0 | 3 0 0 | 35 to 37 |
| 2400 | 50 | *Birmingham and Staffordshire* | 50 0 0 | 10 0 0 | 93 to 94 |
| | 25 | *Ditto*, new shares | 7 10 0 | 10 0 0 | 12 0 0 |
| 928 | 75 | *Birmingham* | 75 0 0 | 10 0 0 | 149 to 151 |
| | | Bishop's Auckland | | | |
| | | Bishop's Stortford | | | |
| | | *Blackburn* £30,000 | | 10 0 0 | |
| | | Blandford | | | |
| | | Blythe | | | |
| | | Bodmin | | | |
| | | Bognor | | | |
| | | *Bolton* £36,582 | | 9 19 5 | |
| | | Boroughbridge | | | |
| | | *Boston* £8000 | | 10 0 0 | |
| 200 | 10 | Bourn | 10 0 0 | 5 0 0 | |
| | | Brackley | | | |
| | | Bradford, Wilts | | | |
| | | *Bradford, Yorksh.* £45,000 | | 9 10 0 | |
| | | Brampton, Cumb. | | | |
| | | Brandon, Suffolk | | | |
| | | Brecon | | | |
| | | Bridge-end, Glam. | | | |
| | | *Brierly Hill* | | | |
| 2250 | 20 | *Brighton* | 20 0 0 | 5 0 0 | 14 to 15 |
| 1125 | 20 | „ new shares | 16 0 0 | 5 0 0 | |
| | | *Brighton and Hove* £50,276 | | | |
| 4250 | 20 | *Bristol* | 20 0 0 | 9 0 0 | 37 0 0 |
| 1725 | 25 | *Bristol and Clifton* | 25 0 0 | 6 0 0 | 25 0 0 |
| | | Brixham | | | |
| | | Braintree | | | |
| 750 | 50 | *Brentford* | 50 0 0 | 6 0 0 | 44 to 46 |
| 800 | 25 | „ new shares | 11 0 0 | 6 0 0 | 11 0 0 |
| | | Brentwood | | | |
| | | *Bridgwater* £6000 | | 5 0 0 | |
| 400 | 10 | Bridlington | 10 0 0 | 5 0 0 | 10 0 0 |
| | | Bridport | | | |
| | | Brigg | | | |
| | | Broadstairs | | | |
| 100 | 50 | Bromley, Kent | 50 0 0 | 6 0 0 | 52 10 0 |
| | | Bromsgrove | | | |
| | | Broughton | | | |
| 120 | 10 | Bruton | 10 0 0 | 4 0 0 | 8 0 0 |
| 100 | 25 | Buckingham | 25 0 0 | 5 0 0 | 25 0 0 |
| | | Bungay (see Becls.) | | | |
| | | Burford | | | |
| | | *Burnley* £19,946 | | 4 10 2 | |
| | | Burslem&Tunstall | | | |
| | | Burton-on-Trent | | | |
| | | *Bury, Lanc.* £6570 | | | |
| | | *Bury St. Edmund's* | | 5 0 0 | |
| 200 | 10 | Buxton | 10 0 0 | | |
| | | Callington | | | |
| | | Calne, Wilts | | | |
| | | Camborne | | | |
| | | *Cambridge* £34,560 | | 9 0 0 | |
| 240 | 50 | *Canterbury* | 50 0 0 | 6 0 0 | |
| 240 | 25 | *Ditto*, second issue | 25 0 0 | 6 0 0 | 57 to 58 |
| | | *Cardiff* £12,000 | | 7 10 0 | 28 to 29 |
| | | Carmarthen | | | |
| | | Castleford | | | |
| | | Chapel on the Frith | | | |
| | | Chard | | | |
| | | *Chatham*(seeRoch. | | | |
| | | Chatteris | | | |
| | | Cheadle | | | |
| | | Chelmsford | | | |
| | | *Cheltenham* £18,732 | | 8 10 0 | |
| | | Chepstow | | | |
| | | Chertsey | | | |
| 230 | 10 | Chesham, Bucks | 10 0 0 | | |
| | | Chester | | | |
| | | Chester-le-Street | | | |
| | | *Chesterfield* £13,123 | | 4 17 6 | |
| 240 | 25 | Chichester | 25 0 0 | 6 0 0 | 30 0 0 |
| | | Chippenham | | | |
| | | Chipping Norton | | | |
| | | Chirk | | | |
| | | Chorley | | | |
| | | Chudleigh | | | |
| | | Cirencester | | | |
| | | *Clifton (Bristol and* | | | |
| | | Cleckheaton, York. | | | |
| | | Clitheroe | | | |
| | | Cockermouth | | | |
| | | Colchester | | | |
| | | Collumpton | | | |
| | | Colne, Lancashire | | | |
| | | Coleford, Gloucest. | | | |
| | | Coggeshall | | | |
| | | *Congleton* £5000 | | 5 0 0 | |
| | | Cookstown | | | |
| | | Cowbridge | | | |
| | | Corsham | | | |
| 800 | 25 | *Coventry* | 25 0 0 | 6 0 0 | 24 to 25 |
| | | Cowes | | | |
| | | Crewkerne | | | |
| | | *Croydon* ... £20,000 | | 5 0 0 | |
| | | Cranbrook ... £1900 | | 5 0 0 | |
| | | Crayford | | | |
| | | Crediton | | | |
| | | Crewe, Cheshire | | | |
| | | Crickhade | | | |
| | | Darlaston | | | |
| | | *Darlington* | | | |
| 250 | 20 | Dartford | 20 0 0 | 7 10 0 | 27 0 0 |
| | | Dartmouth | | | |
| 125 | 20 | Daventry | 20 0 0 | 6 0 0 | 24 8 0 |
| | | Dawley, Salop | | | |
| | | Dawlish | | | |
| | | Dedington | | | |
| 500 | 6 | Denbigh | 6 0 0 | 5 0 0 | 6 0 0 |
| 820 | 10 | Deptford | 10 0 0 | 5 0 0 | 4 10 0 |
| 325 | 50 | *Derby* | 50 0 0 | 10 0 0 | |
| 90 | 20 | Dereham (East) | 20 0 0 | 4 10 0 | |
| 1000 | 5 | *Dewsbury* | 5 0 0 | 10 0 0 | 8 12 6 |
| | | Devizes | | | |
| 4000 | 5 | *Devonport* | 5 0 0 | 6 0 0 | 6 5 0 |
| | | Doncaster | | | |
| 280 | 25 | Dorchester | 25 0 0 | 5 0 0 | 30 0 0 |
| 120 | 25 | Dorking | 20 10 0 | 5 0 0 | 21 10 0 |
| | | Douglas, Isle of M. | | | |
| 209 | 56¼ | *Dover* | 56 10 0 | 4 15 4 | 55 0 0 |
| | | Downham | | | |
| | | Driffield | | | |
| | | Droitwich | | | |
| 600 | 20 | *Dudley* | 20 0 0 | 4 0 0 | 15 to 16 |
| | | Droylsden | | | |
| | | Duumow | | | |
| | | Dunstable | | | |
| | | Durham | | | |
| 276 | 9 | Dursley, Gloster | 9 0 0 | 5 10 0 | 8 0 0 |
| | | Eastbourne | | | |
| | | East Grinstead | | | |
| | | Elland | | | |
| | | Ellesmere | | | |
| | | Eltham | | | |
| | | Enfield | | | |
| 300 | 19 | Epsom and Ewell | 19 0 0 | | |
| | | Evesham | | | |
| | | *Exeter* £40,000 | | 10 0 0 | |
| | | Exmouth | | | |
| | | Eye, Suffolk | | | |
| 64 | 25 | Fakenham | 25 0 0 | 5 0 0 | 25 0 0 |
| | | Falmouth | | | |
| | | Fareham | | | |
| 120 | 25 | Farnham | 25 0 0 | 10 0 0 | 42 0 0 |
| | | Farringdon | | | |
| | | Faversham | | | |
| | | Ferrybridge | | | |
| | | Fleetwood | | | |
| 300 | 10 | Folkestone | 10 0 0 | 10 0 0 | 15 0 0 |
| 240 | 10 | „ new shares | 8 0 0 | 10 0 0 | 13 0 0 |
| | | Fowey | | | |
| 240 | 5 | Framlingham | 5 0 0 | 5 0 0 | 5 0 0 |
| | | Frome | | | |
| | | Garstang | | | |
| | | Gillingham, Dorset | | | |
| | | Glastonbury | | | |
| | | *Glossop* ... £10,000 | | 9 0 0 | |
| 1000 | 25 | *Gloucester* | 25 0 0 | 7 10 0 | 28 0 0 |
| | | Gomersal | | | |
| | | Godalming | | | |
| | | Gosport | | | |
| | | Grantham | | | |
| 20 | | Gravesend | 20 0 0 | 5 0 0 | 21 0 0 |
| 1000 | 10 | *Great Grimsby* | 8 0 0 | 8 0 0 | 12 to 12½ |
| 1000 | 25 | Guildford | 25 0 0 | 4 0 0 | 20 0 0 |
| | | Guisborough | | | |
| | | Hadleigh | | | |
| | | Hales Owen | | | |
| 300 | 6 | Halesworth | 6 0 0 | 7 10 0 | 5 10 0 |
| | | *Halifax* £15,000 | | 10 0 0 | |
| | | Halstead | | | |
| | | Hampton Court | | | |
| | | *Harrogate* £10,000 | | 5 0 0 | |
| | | *Hartlepool* £15,137 | | 7 10 0 | |
| | | Haslingden, Lansh | | | |
| 330 | 50 | Hastings and St. L | 50 0 0 | 6 0 0 | 60 0 0 |
| | | Haverfordwest | | | |
| | | Haverhill | | | |
| | | Haworth, Yorks. | | | |
| | | Hayle | | | |
| | | Helstone | | | |
| | | Hemel Hempstead | | | |
| 300 | 10 | Henley-on-Thams. | 10 0 0 | | |
| | | *Hereford* £5300 | | 4 0 0 | |
| | | Herne Bay | | | |
| 270 | 10 | Hexham | 10 0 0 | 7 0 0 | 12 0 0 |
| | | *Heywood* £10,000 | | 5 0 0 | |
| | | Highworth (Wilts) | | | |
| 230 | 10 | Hinckley | 10 0 0 | 5 0 0 | 7 0 0 |
| | | Hindley, Lancash. | | | |
| | | Hitchen | | | |
| | | Hythe | | | |
| | | Hoddesden | | | |
| | | Holbeach | | | |
| | | *Holmfirth* £8880 | | 3 10 0 | |
| | | Holyhead | | | |
| | | Holywell (see British Provincial) | | | |
| | | Honiton | | | |
| | | Horncastle | | | |
| 10 | | Houghton-le-Sprg. | 10 0 0 | 8 0 0 | |
| | | Horsham | | | |
| | | Howden | | | |
| | | Hull, Sculcoats (see British Provin.) | | | |
| | | *Hull*, £11,712. 10s. | | 5 0 0 | |
| | | Hunmanby | | | |
| 210 | 10 | Hungerford | 10 0 0 | 5 0 0 | 10 0 0 |
| | | Huddersfield | | | |
| 520 | 5 | High Wycombe | 5 0 0 | 6 0 0 | 5 0 0 |
| | | Ilminster | | | |
| | | Ilford | | | |
| | | Ilfracombe | | | |
| | | Ironbridge | | | |
| 1400 | 10 | *Ipswich* | 10 0 0 | 8 0 0 | 15 0 0 |
| 1400 | 10 | „ new shares | 7 10 0 | 8 0 0 | |
| 800 | 25 | *Isle of Thanet* | 20 0 0 | 5 0 0 | 20 to 21 |
| | | *Kendal* £9100 | | 8 15 0 | |
| | | Kenilworth | | | |
| | | Keswick | | | |
| 100 | 25 | Kettering | 25 0 0 | 5 0 0 | 25 0 0 |
| | | *Kiddermins.* £10000 | | 5 0 0 | |
| | | King's Langley | | | |
| | | Kington, Hereford | | | |
| | | Kirkby Lonsdale | | | |
| | | Kirkham, Lanc. | | | |
| | | Knutsford | | | |
| | | Lancaster | | | |
| | | *Llanelly* £3000 | | 5 0 0 | |
| | | Llandovery | | | |
| | | *Leamington Priors* £22,500 | | 6 0 0 | |
| | | Leatherhead | | | |
| | | Ledbury | | | |
| | | *Leeds Old Comp.* old stk., £60,300 | | 10 0 0 | |
| | | new „ £23,775 | | 6 0 0 | |
| | | *Leeds New* £60,000 | | 10 0 0 | |
| | | Leek | | | |
| | | *Leicester* ... £36,230 | | 7 0 0 | |
| | | Leigh | | | |
| 125 | 20 | Leighton Buzzard | 20 0 | 5 0 0 | |
| | | Leominster | | | |
| | | Leyburn, Yorksh. | | | |
| | | Liskeard | | | |
| 330 | 25 | Lewes | 25 0 0 | 5 0 0 | 25 0 0 |
| | | *Lincoln* £8000 | | 10 0 0 | |
| | | Leyland, Lancash. | | | |
| | | Littlehampton | | | |
| 250 | 20 | Lichfield | 20 0 0 | 10 0 0 | 30 0 0 |
| | | *Liverpool United* | 100 0 0 | 9 0 0 | 186 to 188 |
| | | „ ½ sh. | 25 0 0 | 9 0 0 | 46½ to 47 |
| | | Langport | | | |
| | | London Comps.— | | | |
| 5000 | 40 | *British* | 18 0 0 | 1 18 10 | |
| 5000 | 20 | „ Provincial—(Holywell, Hull, Norwich, Potteries, Trowbridge) | 20 0 0 | 7 0 0 | 17 to 19 |
| | 20 | „ Prov., new | 10 0 0 | 7 0 0 | 7 to 9 |
| | 25 | *Commercial* | 25 0 0 | 6 0 0 | 25 to 26 |
| | 25 | „ new shares | 15 0 0 | 6 0 0 | par to 1dis |
| | 25 | „ „ | 2 10 0 | 6 0 0 | par to 1dis |
| 12,000 | 50 | *Chartered* | 50 0 0 | 5 0 0 | 40 to 41 |
| 6000 | 50 | „ new shares | 10 0 0 | 5 0 0 | 7⅞ to 8¼ |
| 2000 | 150 | *City of London* | 150 0 0 | 4 0 0 | 130 to 135 |
| 4000 | 50 | *Equitable* | 50 0 0 | 2 10 0 | 26 to 27 |
| | | „ debentures £46,000 | | | |
| 10,000 | 20 | European—(Amiens, Boulogne, Caen, Havre, Nantes, and Rouen) | 20 0 0 | 5 0 0 | 10 to 12 |
| 2000 | 20 | „ do. new | 7 0 0 | 5 0 0 | 5 to 7 |

| Number of Shares issued. | Amount per Shar | Name of Company. | Amount paid up per Share | Dividend per Cent per Ann. | Price. |
|---|---|---|---|---|---|
| | £ | | £ s. d | £ s. d | £ s. d |
| 15,000 | 10 | *Gt.Cntl.Consumers* | 10 0 0 | 5 0 0 | 10 to 12 |
| 8000 | 50 | *Impl.Continental* —(Amsterdam, Aix-la-Chapelle Antwerp, Berlin, Bordeaux, Brussels, Cologne, Frankft., Ghent, Haarlem Hanover, Lille, Marseilles, Rotterdam, Toulouse, Vienna) | 42 0 0 | 5 19 0 | 41 to 43 |
| 7000 | 50 | „ new shares | 41 0 0 | 9 15 0 | 60 to 65 |
| | 50 | „ third issue | 43 10 0 | 8 16 0 | 55 to 60 |
| 10,000 | 50 | *Imperial* | 50 0 0 | 6 0 0 | 66 to 68 |
| 3000 | 50 | „ new shares | 40 0 0 | 6 0 0 | 53 to 55 |
| | | „ debentures £50,500 | | | |
| 4000 | 40 | *Independent* | 40 0 0 | 6 0 0 | 46 to 47 |
| 3000 | 50 | *London* | 50 0 0 | | |
| 6000 | 25 | „ preference | 10 0 0 | 6 0 0 | 10 0 0 |
| 3000 | 50 | „ 2nd do. | 50 0 0 | | 15 to 18 |
| 9000 | 50 | *Phœnix* | 49 0 0 | 4 10 0 | 26 to 27 |
| 1000 | 100 | *Ratcliff* | 90 0 0 | 5 0 0 | 60 to 65 |
| 4000 | 25 | *South Metrop.* | 25 0 0 | 6 0 0 | 22 to 23 |
| | | Surrey Consumers' | | | |
| 9000 | 50 | United General—(Cork, Dublin, Limerick) | 50 0 0 | 2 0 0 | 16 to 17 |
| 12,500 | 20 | Western | 19 0 0 | | 7 0 0 |
| | | Lostwithiel | | | |
| | | Loughborough | | | |
| 240 | 25 | *Louth* | 25 0 0 | 6 0 0 | 26 10 0 |
| | | Lowestoft (see Bee. | | | |
| 611 | 5 | Ludlow Union | 5 0 0 | 6 0 0 | 5 0 0 |
| | | Luton | | | |
| | | Lutterworth | | | |
| | | Lyme Regis | | | |
| | | Lymington | | | |
| | | Malmesbury | | | |
| | | *Macclesfield* 32,000 | | 3 15 0 | |
| | | Maidenhead | | | |
| 300 | 50 | *Maidstone* | 50 0 0 | 10 0 0 | 90 0 0 |
| | | Maldon | | | |
| | | Marlborough | | | |
| | | Malton (New) | | | |
| | | Malvern | | | |
| | | Manningtree | | | |
| | | *Mansfield* £5000 | | 10 0 0 | |
| | | March | | | |
| | | *Margate* (see I. of T. | | | |
| | | Market Deeping | | | |
| | | Market Drayton | | | |
| 132 | 25 | Market Harboro' | 25 0 0 | 6 0 0 | 30 0 0 |
| | | Market Raisin | | | |
| | | Market Weighton | | | |
| | | Marlow | | | |
| 870 | 10 | Maryport | 10 0 0 | 6 0 0 | 12 0 0 |
| | | Melksham | | | |
| | | Melton Mowbray | | | |
| | | Merthyr Tydvil | | | |
| | | Mere | | | |
| | | *Middleton* £9039 | | 5 0 0 | |
| | | Midsummer Norton | | | |
| | | Middlesboro' | | | |
| | | Mildenhall | | | |
| | | Mitcham | | | |
| | | Mold | | | |
| 700 | 10 | Monmouth | 10 0 0 | 5 0 0 | |
| | | Monk Wearmouth | | | |
| | | Moreton in Marsh | | | |
| | | Morley | | | |
| | | Mottram | | | |
| | | Nantwich | | | |
| | | Neath | | | |
| | | Needham Market | | | |
| | | *Newark* £5000 | | 10 0 0 | |
| 250 | 20 | Newbury | 20 0 0 | 5 0 0 | 20 0 0 |
| 13,000 | 5 | Newcastle & Gateshead Union | 5 0 0 | 8 0 0 | 8 0 0 |
| | | *Newcastle-under-Lyne* £6200 | | 4 0 0 | |
| 600 | 5 | Newmarket | 5 0 0 | 6 0 0 | 5 0 0 |
| | | Newnham, Glost. | | | |
| | | Newent | | | |
| | | *New Mills* £2115 | | 8 0 0 | |
| | | *Newport, M.* £11720 | | | |
| 320 | 50 | *Newport, Isle of W.* | 38 0 0 | 4 0 0 | 17 to 19 |
| | | Newport Pagnell | | | |
| | | Newport, Salop | | | |
| | | Newton Abbot | | | |
| | | Newton, Lanc. | | | |
| | | Northallerton | | | |
| | | North Walsham | | | |
| 542 | 20 | *Northampton* | 18 0 0 | 10 0 0 | 27 0 0 |
| | | Northfleet | | | |
| | | Northwich | | | |
| | | *Norwich* (see British Pro. £40,000 | | 7 0 0 | |
| 900 | 50 | *Nottingham* | 50 0 0 | 10 0 0 | |
| 900 | 50 | New shares | | 10 0 0 | |
| | | Nuneaton | | | |
| | | Oakham | | | |
| | | Oakhampton | | | |
| 200 | 10 | Odiham, Hants | 10 0 0 | 3 10 0 | 10 0 0 |
| | | *Oldham* | | | |
| | | Olney | | | |
| | | Ongar | | | |
| | | Ormskirk | | | |
| | | Otley, Yorkshire | | | |
| | | Oundle | | | |
| 120 | 150 | *Oxford* | 150 0 0 | 8 0 0 | 260 0 0 |
| | | *Over Darwen* £8000 | | 5 0 0 | |
| | | Padstow | | | |
| | | Pately Bridge, Yrk. | | | |
| 250 | 20 | Penrith | 15 0 0 | 6 10 0 | 21 0 0 |
| | | Penryn | | | |
| | | Penzance | | | |
| 200 | 10 | Petworth | 10 0 0 | 8 0 0 | 12 0 0 |
| | | Petersfield | | | |
| | | Pickering | | | |
| 3000 | 10 | *Plymouth* | 10 0 0 | 6 0 0 | 11 0 0 |
| | | Pocklington | | | |
| | | Pontefract | | | |
| | | *Pontypridd* | | | |
| 400 | 10 | Poole | 10 0 0 | 5 0 0 | 10 0 0 |
| | | Port Madoc | | | |
| 600 | 50 | *Portsea Island* | 53 0 0 | 5 0 0 | 45 to 47 |
| 400 | 10 | Prescott | 9 0 0 | 4 13 4 | 7 0 0 |
| 3000 | 20 | *Preston* | 20 0 0 | 10 0 0 | |
| | | Pwllhelli | | | |
| | | *Pudsey* £12,000 | | 5 0 0 | |
| | | *Radcliff and Pilkington* £9000 | | 4 12 10 | |
| | | Ramsay, I. of Man | | | |
| | | *Ramsgate* (see Isle of Thanet) | | | |
| | | Ravenglass | | | |
| 1000 | 10 | *Reading* | 10 0 0 | 3 0 0 | 7 0 0 |
| 500 | 20 | *Reading Union* | 20 0 0 | 6 0 0 | 17 0 0 |
| | | Redditch | | | |
| | | Redruth | | | |
| | | Reigate | | | |
| | | Retford (East) | | | |
| | | Rhyl | | | |
| | | Richmond (Surrey) | | | |
| | | Ringwood | | | |
| | | Ripon | | | |
| | | *Rochester and Chatham* £20,000 | | 6 0 0 | |
| | | Rochford | | | |
| | | Rockingham | | | |
| | | Romford | | | |
| | | Ross | | | |
| 245 | 25 | *Rotherham* | 25 0 0 | 6 0 0 | 40 10 0 |
| | | Royston | | | |
| | | Ruabon | | | |
| | | Rugby | | | |
| | | Rugeley | | | |
| | | *Runcorn* £11,000 | | 7 10 0 | |
| | | Ruthin | | | |
| 500 | 10 | Ryde | 10 0 0 | 6 0 0 | 12 0 0 |
| | | Rye | | | |
| | | Rounsey | | | |
| | | Saddleworth | | | |
| 225 | 20 | Saffron Walden | 20 0 0 | 3 15 0 | 19 0 0 |
| | | St. Austel | | | |
| | | St. Asaph | | | |
| | | St. Colomb | | | |
| | | *St. Helen's* £7500 | | 7 10 0 | |
| | | St. Helier's (Jersey) | | | |
| | | St. Ives, Hunting. | | | |
| | | St. Ives, Cornwall | | | |
| 250 | 10 | St. Neot's | 10 0 0 | 8 0 0 | 12 0 0 |
| | | St. Peter's Port, (Guernsey) | | | |
| 320 | 25 | Salisbury | 25 0 0 | 6 0 0 | 28 to 30 |
| | | Sandbach | | | |
| 140 | 10 | Saxmundham | 10 0 0 | 5 0 0 | 10 0 0 |
| | | Scarborough | | | |
| | | Sedburgh | | | |
| | | Selby | | | |
| | | Settle | | | |
| 290 | 10 | Sevenoaks | 10 0 0 | 5 0 0 | 10 0 0 |
| | | Shaftesbury | | | |
| 5400 | 25 | *Sheffield United* | 24 0 0 | 8 6 8 | 30 0 0 |
| | | Shelton, Potteries (see Brit. Prov.) | | | |
| | | Shepton Mallet | | | |
| | | Sherborne | | | |
| 2914 | 5 | Shields Tynemth. | 5 0 0 | 3 0 0 | 5 0 0 |
| | | Shields (South) | | | |
| | | Shiffnal, Salop | | | |
| 1000 | 5 | *Shipley* | 5 0 0 | 6 0 0 | 5 18 6 |
| | | Shipston-on-Stour | | | |
| | | Shoreham | | | |
| | | *Shrewsbury* £10,000 | | 7 0 0 | |
| 400 | 10 | Skipton | 10 0 0 | 4 0 0 | 11 0 0 |
| 250 | 10 | Sleaford | 10 0 0 | | |
| | | Slough | | | |
| | | Snaith | | | |
| | | Soham | | | |
| | | Southwold | | | |
| | | South Molton | | | |
| 1000 | 50 | *Southampton* | 32 0 0 | 5 0 0 | |
| | | Sowerby, Yorksh. | | | |
| | | Stretford | | | |
| | | Stokesly | | | |
| | | *Stafford* £10,000 | | 5 0 0 | |
| | | Staines and Egham | | | |
| | | *Staley Bdg.* £15,000 | | 10 0 0 | |
| | | *Stamford* £11,250 | | 3 0 0 | |
| | | *Stockton-on-Tees* £7980 | | 9 5 0 | |
| 840 | 9½ | Stockton, New | 9 10 0 | 9 0 0 | 8 0 0 |
| 960 | 10 | Stoke-upon-Trent | 10 0 0 | 5 10 0 | 10 0 0 |
| 500 | 10 | „ new shares | 4 0 0 | 5 10 0 | 10 0 0 |
| | | Stone, Stafford | | | |
| | | Stoney Stratford | | | |
| | | Stourbridge | | | |
| | | Stowmarket | | | |
| 150 | 20 | Stratford-on-Avon | 20 0 0 | 7 10 0 | 30 0 0 |
| | | Stroud | | | |
| 169 | 10 | Swaffham | 10 0 0 | 5 0 0 | 5 10 0 |
| | | *Swansea* £9000 | | | |
| | | Sudbury | | | |
| | | Sunderland, old | | | |
| 6400 | 5 | *Sunderland*, new | 5 0 0 | | |
| | | Sutton | | | |
| | | Swindon | | | |
| | | Sydenham | | | |
| 2800 | 5 | *Taunton* | 5 0 0 | None | 2 10 0 |
| | | Tadcaster | | | |
| | | Tamworth | | | |
| | | Tavistock | | | |
| | | Teignmouth | | | |
| | | Tenbury | | | |
| | | Tenby | | | |
| | | Tenterden £2000 | | 2 10 0 | |
| | | Tetbury, Gloster | | | |
| | | Tewkesbury | | | |
| | | Thame | | | |
| | | Thetford | | | |
| | | Thirsk | | | |
| | | Thornbury | | | |
| | | Thorne | | | |
| | | Tiverton | | | |
| 670 | 5 | Todmorden | 3 0 6 | | |
| | | Torquay | | | |
| | | Torrington, Devon | | | |
| | | Totnes | | | |
| | | Totnes and Bridgetown Consumers | | | |
| 4000 | 5 | Tottenham | 3 10 0 | 6 0 0 | 3 0 0 |
| | | Towcester | | | |
| 200 | 16 | Tring | 10 0 0 | 5 0 0 | 10 0 0 |
| | | Trowbridge (see British Provin.) | | | |
| 75 | 50 | Truro | 50 0 0 | 2 0 0 | |
| | | Tunbridge | | | |
| | | Tunbridge Wells | | | |
| | | Ulverston | | | |
| | | Uppingham | | | |
| 240 | 5 | Upton-on-Severn | 5 0 0 | 5 0 0 | 5 0 0 |
| | | Usk, Monmouth | | | |
| | | Uttoxeter | | | |
| | | Uxbridge | | | |
| 1000 | 25 | *Wakefield*, old capl | 25 0 0 | 6 0 0 | 25 0 0 |
| 1600 | 5 | „ new „ | 5 0 0 | 6 0 0 | 5 0 0 |
| 300 | 10 | Wallingford | 10 0 0 | 5 0 0 | 8 0 0 |
| | | Wandsworth | | | |
| | | Wantage | | | |
| | | *Warrington* £23304 | | 10 0 0 | |
| 100 | 10 | Wareham | 10 0 0 | 3 10 0 | 8 0 0 |
| 120 | 25 | Warminster | 25 0 0 | 5 0 0 | 27 0 0 |
| | | Warth | | | |
| | | *Warwick* £15,000 | | 6 0 0 | |
| | | Watford | | | |
| | | Welchpool, Mntgy. | | | |
| | | Wellingborough | | | |
| | | Wellington, Salop | | | |
| | | Wellington, Smrst. | | | |
| | | *Wells, Smrst.* £5000 | | 7 10 0 | |
| | | Westbury | | | |
| | | Weston-sup.-Mare | | | |
| 2000 | 5 | West Ham | 5 0 0 | 6 0 0 | 5 0 0 |
| | | Whitby | | | |
| | | Whitehaven | | | |
| | | Whitstable | | | |
| | | Whittlesea | | | |
| | | *Wigan* £10,160 | | 10 0 0 | |
| | | Willenhall | | | |
| | | Winchelsea | | | |
| | | Winslow | | | |
| 240 | 10 | Wimborne Minster | 10 0 0 | | |
| | | Wincanton | | | |
| 360 | 50 | Winchester | 50 0 0 | 6 0 0 | |
| 900 | 12½ | Windsor | 12 10 0 | 10 0 0 | 23 0 0 |
| | | Witham | | | |
| | | Witney | | | |
| 4448 | 10 | *Wolverhampton* | 10 0 0 | 7 0 0 | 15 0 0 |
| | | Woburn | | | |
| 210 | 10 | Wokingham | 10 0 0 | | 10 0 0 |
| | | Woodbridge | | | |
| | | Wooler | | | |
| | | Wotton-un.-Edge | | | |
| | | *Worcester* £29,000 | | 8 0 0 | |
| | | Workington | | | |
| | | Worksop and Radford | | | |
| | | Wirksworth | | | |
| | | Worthing | | | |
| | | Wrexham | | | |
| | | Woolwich | | | |
| | | Woolwich Consms. | | | |
| | | Woolwich (North) | | | |
| | | Wymondham | | | |
| | | Yarm | | | |
| 795 | 20 | Yarmouth | 20 0 0 | | 15½ to 16½ |
| | | Yeadon, near Leeds | | | |
| | | Yeovil | | 7 0 0 | |
| | | *York Untd.* £55,000 | | | |
| | | **SCOTLAND.** | | | |
| | 5 | Aberdeen | 3 0 0 | | 3 16 6 |
| | | Airdrie | | | |
| | | Alloa | | | |
| | | Annan | | | |
| | | Anstruther | | | |
| | | Ardrossan | | | |
| 550 | 20 | Arbroath | 20 0 0 | 7 10 0 | 27 10 0 |
| | | Auchterarder | | | |
| 750 | 2 | Auchtermuchty | 2 0 0 | 6 0 0 | 2 10 0 |
| | | Ayr, old | | | |
| | | Ditto, new | | | |
| | | Banff | | | |
| | | Barrhead | | | |
| | | Bathgate | | | |
| | | Beith | | | |
| | | Bervie | | | |
| | | Biggar | | | |
| 400 | 6 | Blairgowrie | 6 0 0 | 5 0 0 | 8 0 0 |
| | | Brechin | | | |
| | | Bridge of Allan | | | |
| | 2 | Broughty Ferry | 2 0 0 | 5 0 0 | 2 0 0 |
| | | Burntisland | | | |
| | | Callen | | | |
| | | Campbelton | | | |
| | | Clackmannan | | | |
| | | Coatbridge | | | |
| | | Coldstream | | | |
| | | Collinsburgh | | | |
| | | Crieff | | | |
| | | Crail, Fife | | | |
| | | Cumbernauld | | | |
| | | Cumnock | | | |
| 600 | 5 | Cupar Angus | 5 0 0 | 6 0 0 | 5 10 0 |
| 250 | 10 | Cupar Fife | 10 0 0 | 7 10 0 | 14 0 0 |
| | | Dalkeith | | | |
| | | Dingwall | | | |
| | | Dornoch | | | |
| | | Douglas | | | |
| | | Dumbarton | | | |
| 400 | 20 | Dumfries | 14 0 0 | 5 0 0 | 20 0 0 |
| | | Dunbar | | | |
| | | Dunblane | | | |
| 23½ | | *Dundee*, old £29,687 | 23 15 0 | 8 8 0 | 30 10 0 |

| Number of Shares issued. | Amount per Share | Name of Company. | Amount paid up per Share | Dividend per Cent. per Ann. | Price. |
|---|---|---|---|---|---|
| | £ | | £ s. d | £ s. d | £ s. d |
| | 5 | *Dundee*, nw | £33,851 | 5 0 0 | 2 10 0 | 4 0 0 |
| 860 | 10 | Dunfermline | | 10 0 0 | 6 0 0 | 12 12 0 |
| | | Dunkeld | | | | |
| | | Dunse | | | | |
| | | Dysart | | | | |
| 6000 | 25 | *Edinburgh Gas Co.* | | 25 0 0 | 10 0 0 | 52 10 0 |
| | 25 | *„ and Leith Co.* | | | | |
| | | | £98,640 | 18 0 0 | 7 10 0 | 27 13 6 |
| | | Elie | | | | |
| | | Elgin | | | | |
| | | Falkirk, old | | | | |
| | | „ new | | | | |
| | | Falkland | | | | |
| | | Ferry Port on Craig | | | | |
| | | Fochabers | | | | |
| | | Forfar | | | | |
| | | Fort William | | | | |
| | | Fraserburgh | | | | |
| | | Galashiels | | | | |
| | | Garlieston | | | | |
| | | Gatehouse n. Fleet | | | | |
| | | Girvan | | | | |
| | 25 | *Glasgow* | £122,500 | 25 0 0 | 10 0 0 | 50 0 0 |
| 15000 | 10 | *Glasgow City and Suburban* | | 9 0 0 | 7 15 0 | 15 12 0 |
| | | Grangemouth | | | | |
| | | Grahamston | | | | |
| | | Haddington | | | | |
| | | *Hamilton* | £7500 | | 8 0 0 | |
| | | Hawick | | | | |
| | | Helensburgh | | | | |
| | | Huntly | | | | |
| | | Inverary | | | | |
| 400 | 1 | Inverkeithing | | 1 0 0 | 5 0 0 | 0 0 |
| 1200 | 10 | *Inverness Gas and Water* | | 10 0 0 | 7 10 0 | 15 0 0 |
| 2400 | 5 | „ new shares | | 1 5 0 | 7 10 0 | 2 5 0 |
| | | Irvine | | | | |
| | | Jedburgh | | | | |
| | | Johnstone, near Paisley | | | | |
| | | Keith | | | | |
| | | Kelso | | | | |
| | | Kilmarnock | | | | |
| | | Kincardine | | | | |
| | | Kinghorn | | | | |
| | | Kingskittle, Fife | | | | |
| | | Kinross | | | | |
| | | Kirkaldy | | | | |
| 320 | 5 | Kirkcudbright | | 5 0 0 | 5 0 0 | 5 0 0 |
| 1000 | 3 | Kirkintulloch, near Glasgow | | 3 0 0 | 5 0 0 | 3 0 0 |
| 227 | 5 | Kirkwall | | 5 0 0 | 5 0 0 | 4 10 0 |
| 518 | 5 | Kirriemuir | | 5 0 0 | 6 0 0 | |
| | | Lanark | | | | |

| Number of Shares issued. | Amount per Share | Name of Company. | Amount paid up per Share | Dividend per Cent. per Ann. | Price. |
|---|---|---|---|---|---|
| | £ | | £ s. d | £ s. d | £ s. d |
| | | Largo, near Leven | | | |
| | | Largs | | | |
| | | Lasswade, n. Edin. | | | |
| | | Lauder | | | |
| | | Leith | | | |
| | | Leslie, Fife | | | |
| | | Lesmahago | | | |
| | | Leven | | | |
| | | Linlithgow | | | |
| | | Linton, n. Nobleh. | | | |
| | | Lochee, n. Dundee | | | |
| | | Lochgilphead | | | |
| | | Lochwinnock, near Paisley | | | |
| 1200 | 1 | Markinch | | 1 0 0 | 7 10 0 | 1 5 0 |
| | | Mauchline | | | | |
| | | Maxwell-town, n. Dumfries | | | |
| | | Maybole, Ayrshire | | | |
| | | Maryhill, near Glasgow | | | |
| | | Melrose | | | |
| 718 | 2 | Mid & East Calder | | 2 0 0 | | 2 0 0 |
| 192 | 5 | Moffat | | 5 0 0 | | |
| | 13½ | Montrose | | 13 10 0 | 7 11 1 | |
| | | Musselburgh | | | | |
| | | Nairn | | | | |
| | | Neilston, n. Glasg. | | | | |
| | | Newmills, near Kilmarnock | | | | |
| | | Newburgh, Fife | | | | |
| | | Newton-on-Aye | | | | |
| | | Newton Stewart | | | | |
| | | North Berwick, n. Haddington | | | | |
| | | North Queensferry | | | | |
| | | Oban | | | | |
| | | Peebles | | | | |
| 800 | 25 | Perth | | 25 0 0 | 4 16 0 | 22 10 0 |
| | 5 | „ new | | 5 0 0 | | 1 17 6 |
| | | Peterhead | | | | |
| | | Pittenweem | | | | |
| | | Pollokshaws, near Glasgow | | | | |
| | | Port Glasgow | | | | |
| | | Portobello, n. Edin. | | | | |
| | | Prestonpans | | | | |
| | | Rutherglen, near Glasgow | | | | |
| | | Renfrew, n. Paisley | | | | |
| | | Saltcoats | | | | |
| | | Sanquhar | | | | |
| | | Selkirk | | | | |
| | | South Queensferry | | | | |
| | | St. Andrew's | | | | |

| Number of Shares issued. | Amount per Share | Name of Company. | Amount paid up per Share | Dividend per Cent. per Ann. | Price. |
|---|---|---|---|---|---|
| | £ | | £ s. d | £ s. d | £ s. d |
| | | Stewarton | | | |
| | | Stirling | | | |
| | | Stoneheavn | | | |
| | | Stonhouse, Lanrks. | | | |
| | | Stornoway | | | |
| | | Stranraer | | | |
| | | Strathaven, near Hamilton | | | |
| | | Thurso | | | |
| | | Tillicoultry, n. Alloa | | | |
| 800 | 1 | Tranent | | 1 0 0 | | 1 0 0 |
| | | Troon | | | |
| | | Wick | | | |
| | | Wigton | | | |
| | | Wemyss | | 4 10 0 | |
| | | **IRELAND.** | | | |
| 300 | 10 | Armagh | | 10 0 0 | 8 0 | 14 10 0 |
| | | Ballinasloe | | | |
| 700 | 50 | *Belfast* | | 50 0 0 | |
| | | Ballymena | | | |
| | | Ballymoney | | | |
| | | Carrickfergus | | | |
| | | Carlow, new | | | |
| | | Cork (see Un. Gen.) | | | |
| 1300 | 5 | Clonmel Consumrs | | 5 0 0 | 5 0 0 | 5 0 0 |
| | | Drogheda | | | | |
| 19,000 | 10 | *Dublin Consumers* | | 5 0 0 | 7 0 0 | 6 0 0 |
| | | *Dublin Hibernian* (see United Gen.) | | | | |
| 160 | 25 | Dundalk | | 25 0 0 | | 22 0 0 |
| | | Dungannon | | | | |
| 871 | 5 | *Downpatrick* | | 5 0 0 | 4 0 0 | |
| | | Enniskillen | | | | |
| | | Galway | | | | |
| 400 | 10 | Kilkenny | | 10 0 0 | 8 0 0 | 11 5 0 |
| | | Larne | | | | |
| | | Limerick (see U.G.) | | | | |
| 1725 | 5 | Limerick Consum. | | 5 0 0 | 5 0 0 | 5 0 0 |
| 600 | 15 | Londonderry | | 15 0 0 | 6 13 4 | 21 10 0 |
| 500 | 7 | Lisburn | | 7 0 0 | 7 10 0 | 7 0 0 |
| 520 | 10 | Lurgan | | 6 0 0 | 6 0 0 | 6 0 0 |
| | | Mallow | | | | |
| | | Monaghan | | | | |
| | | Nenagh | | | | |
| 448 | 5 | Newtownards | | 5 0 0 | 4 0 0 | 5 0 0 |
| | | New Ross | | | | |
| | | Newry | | | | |
| | | Omagh | | | | |
| 125 | 20 | Portadown | | 20 0 0 | 6 0 0 | 20 0 0 |
| 600 | 10 | Sligo | | 10 0 0 | | |
| | | Tipperary | | | | |
| | | Tralee | | | | |
| | | Waterford | | | | |
| | | Wexford | | | | |

The Gas Works in the undermentioned towns belong to private individuals:—

| | | | | |
|---|---|---|---|---|
| Abergavenny. | Farsley. | Holt. | Oswestry. | Sheerness. | Ware. (2 works) |
| Bridgenorth. | Gainsborough | Huntingdon. | Peterborough. | Sidmouth. | Wem. |
| Carnarvon. | Goole. | Hyde (Cheshire) | Pontypool. | Sittingbourne. | Weymouth. |
| Deal. | Harleston. | Kingston-on-Thames. | St. Alban's. | Spalding. | Whitehurch (Salop). |
| Diss | Hatfield. | Lynn. | Sandwich. | Waltham Abbey. | Wisbeach. |
| Ely. | Hertford. | Morpeth. | Seaham Harbour. | | |

The Gas Works belong to the Corporations, or to Commissioners acting under special acts of Parliament, in the following towns:—

| | | | | | |
|---|---|---|---|---|---|
| Carlisle. | Keighly. | Milton (Kent). | Rothesay. | Southport (Lanc.) | Walsall. |
| Cashel. | Knaresborough. | Paisley. | Richmond (Yorkshire). | Stockport | Wells (Norfolk). |
| Coleraine. | Lytham (Lanc.) | Rochdale. | Salford. | Strabane. | Youghall. |
| Greenock. | Manchester. | | | | |

# Price Current.

*The following List of Prices is corrected by an eminent wholesale house in each trade up to the latest period:—*

## CASTINGS, per Ton.

Average Weight of Cast Iron Gas Pipes, per Yard.

| 1½ in. | 2 in. | 2½ in. | 3 in. | 4 in. | 5 in. | 6 in. | 7 in. | 8 in. | 9 in. | 10 in. | 12 in. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 21 | 28 | 33 | 51 | 70 | 89 | 107 | 136 | 149 | 177 | 208 lbs. |

| Retail Prices are 5 to 10 per cent. higher. | London. | Glasgow | Newcastle. | Wales. | Yorksh., Derbysh. and Staffdsh. |
|---|---|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. |
| Pig Iron, No. 1 | 3 7 6 | 2 5 0 | 3 0 0 | 3 15 0 | 3 10 0 |
| 1¼ and 2 inches Socket Pipes | 6 0 0 | 5 0 0 | 5 10 0 | 5 15 0 | 5 15 0 |
| 2½ and 3 do. do. | 5 17 6 | 4 15 0 | 5 7 6 | 5 12 6 | 5 12 6 |
| 4 and 5 do. do. | 5 15 0 | 4 12 6 | 5 5 0 | 5 10 0 | 5 10 0 |
| 6 inches and upwards do. | 5 12 6 | 4 10 0 | 5 2 6 | 5 7 6 | 5 7 6 |
| Extra for bends, branches, and connection | 2 0 0 | 2 0 0 | 2 0 0 | 2 0 0 | 2 0 0 |
| Retorts, 1st fusion | 5 5 0 | .. | .. | 4 17 6 | 5 0 0 |
| Do. 2nd fusion | 5 15 0 | 4 10 0 | 4 17 6 | 5 5 0 | 5 5 0 |
| Tank Plates, ¾ thick and above | 5 10 0 | 4 17 6 | 5 0 0 | 5 7 6 | 5 17 6 |
| Do. less than ¾ | 5 15 0 | 5 0 0 | 5 0 0 | .. | 5 10 0 |
| Plain Castings ex. models | 5 15 0 | 5 0 0 | 5 0 0 | 5 10 0 | 5 10 0 |

## COALS.

| NEWCASTLE. Unscreened. | s. | d. | |
|---|---|---|---|
| Burnhope | 5 | 3 | per ton. |
| Ravensworth Pelaw | 5 | 9 | „ |
| Dean's Primrose | | | |
| Pelton | | | |
| Brancepeth | 6 | 0 | „ |
| Medomsley | | | |
| Pelaw | 6 | 3 | „ |
| Eighton Moor | | | |
| Felling Main | | | |
| New Pelton | | | |
| Peareth | 6 | 6 | „ |
| South Pelaw | | | |
| Waldridge | | | |
| Washington Hutton | | | |
| South Peareth | | | |
| Ramsay's Cannel | 12 | 0 | „ |
| Cowen's Cannel | 12 | 0 | „ |

| DERBYSHIRE. Unscreened. | s. | d. | |
|---|---|---|---|
| Clay Cross, Deep Main, and New Birchwood | 6 | 6 | per ton. |
| SCOTCH CANNEL. | | | |
| Boghead | 19 | 0 | „ |
| Kirkness.....best | 23 | 0 | „ |
| Capeldrae, first quality | 20 | 0 | „ |
| Ditto, second quality | 10 | 0 | „ |
| Lothian | 18 | 0 | „ |
| Lesmahago at Glasgow | 16 | 6 | „ |
| Ditto at Leith | 18 | 0 | „ |
| Arniston | 16 | 0 | „ |
| Wemyss | 15 | 0 | „ |
| Donibristle | 10 | 6 | „ |
| Bridgeness | 11 | 0 | „ |
| Kinneil | | | |
| Lochgelly | 9 | 6 | „ |
| Lumphinan | | | |

## FIRE GOODS.

Best Bricks, 50s. per 1000, at Newcastle.
Do. Clay, 12s. per ton do.

## LEAD.

Soft pig, £18. 10s. per ton.

## WROUGHT IRON TUBING, subject to 40 per cent. Discount.

| | 2 inches. | 1½ inch. | 1¼ inch. | 1 inch. | ¾ inch. | ½ inch. |
|---|---|---|---|---|---|---|
| | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| Patent welded tubes, from 2 to 12 feet, per foot | 1 8 | 1 0 | 0 10 | 0 7 | 0 5 | 0 4½ |
| Ditto „ 6 in. to 18 in., each | 3 0 | 2 0 | 1 9 | 1 3 | 1 0 | 0 9 |
| Connecting pieces, or long screws | 3 6 | 2 3 | 2 0 | 1 6 | 1 2 | 0 11 |
| Bends, springs, and elbows, wrought iron | 3 9 | 2 3 | 1 9 | 1 6 | 0 10 | 0 8 |
| Tees, wrought or cast | 4 0 | 2 6 | 2 0 | 1 6 | 1 1 | 0 10 |
| Crosses, wrought or cast | 4 6 | 3 0 | 2 6 | 2 0 | 1 6 | 1 2 |
| Iron cocks | 17 6 | 9 6 | 7 6 | 4 6 | 3 3 | 2 6 |
| Ditto, with brass plug | 28 0 | 16 0 | 13 0 | 7 0 | 5 6 | 4 6 |
| Diminishing sockets, caps, plugs, and nipples | 1 3 | 0 9 | 0 8 | 0 6 | 0 5 | 0 4 |
| Plain sockets | 1 0 | 0 8 | 0 7 | 0 5 | 0 4 | 0 3 |
| Flanches | 1 9 | 1 6 | 1 3 | 1 0 | 0 9 | |
| Syphons, 2 quart | 15 0 | 14 0 | 13 6 | 13 0 | 12 0 | |
| Ditto 1 quart | 11 6 | 10 6 | 10 3 | 10 0 | 9 6 | |

## FREIGHTS, per Ton.

| *Coastwise—Newcastle.* | s. | d. |
|---|---|---|
| Chatham & Roches. | 6 | 3 |
| Cork | 9 | 0 |
| Dover | 7 | 6 |
| Dublin | 9 | 3 |
| Exeter Quay | 9 | 0 |
| Folkestone | 8 | 0 |
| Hastings | 8 | 6 |
| Ipswich | 7 | 0 |
| Jersey | 9 | 3 |
| London | 6 | 6 |
| Lowestoft | 5 | 6 |
| Lynn | 6 | 9 |
| Margate | 8 | 0 |
| Portsmouth | 8 | 6 |
| Plymouth | 7 | 9 |
| Southampton | 8 | 6 |
| Weymouth | 9 | 0 |
| Yarmouth | 5 | 9 |
| *Foreign.* | | |
| Amsterdam | 10 | 0 |
| Boulogne | 9 | 0 |
| Barcelona | 15 | 0 |
| Bordeaux | 10 | 6 |
| Calais | 8 | 3 |
| Dieppe | 8 | 6 |
| Hamburg | 9 | 6 |
| Havre | 9 | 9 |
| Lisbon | 11 | 0 |
| Rotterdam | 9 | 0 |
| Rouen | 12 | 6 |
| St. Petersburgh | 11 | 6 |
| Stettin | 8 | 0 |
| Trieste and Venice | 18 | 0 |